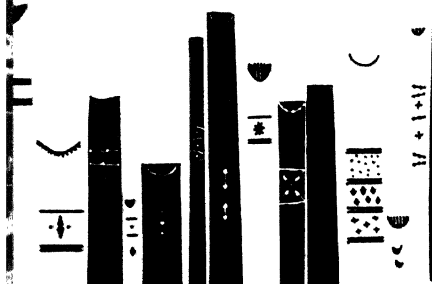


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THE WORLD BOOK
MODERN PICTORIAL
ENCYCLOPEDIA
COMPREHENSIVE

Twelve Volumes and Guide

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THEIR RESPECTIVE FIELDS

Guide Volume

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Preface to PART ONE

THE alphabetical arrangement of encyclopedic material is the best plan that can be followed in making the world's knowledge available to the reader, without waste of his time or energy. Every user of THE WORLD BOOK Encyclopedia understands the advantage of being able to turn to any topic under its specific title without first consulting a supplementary index. The plan of listing in regular alphabetical order all topics and cross references has proved eminently satisfactory for the casual or average user who desires to consult the work for purely reference purposes. However, in laying plans for this new edition, the editors and publishers had in mind a special system of organization designed to meet the needs of the intensive user, such as the teacher, the serious-minded student, or the club woman, who wishes to find all available material in the set on any subject whatsoever.

Part I of this thirteenth volume provides this system of organization. It is appropriately named and described in the general preface to the publication as a Guide which "gives organization to the subject matter as a whole, reveals the underlying relationships, and furnishes a course of study for every branch of learning." In other words, the twelve volumes present a multitude of subjects in alphabetical order, while the Guide classifies this material according to inherent relationships and human interests and needs.

The Guide groups the entire contents of the Encyclopedia into thirty-eight main departments. These major divisions, arranged in alphabetical order, are listed in the Table of Contents. Each section is a classified grouping of all WORLD BOOK articles on a particular subject. Throughout there are references to page numbers, to facilitate the locating of any article or group of articles in which the reader may be interested. While the classifications sometimes vary in details, they are all uniform in respect to essential features. Each unfolds the general range and character of the subject treated, its main divisions, and the relationships of individual topics. The classifications, it can be seen, are much more than lists of article titles. By frequent use of explanatory phrases, and an illuminating method of indentation, they lead the reader from topic to topic until he understands the entire plan and scope of each department of knowledge. Thus, in Part I of this volume THE WORLD BOOK Encyclopedia provides an invaluable aid to reading and research.

M. V. O'SHEA, Editor-in-Chief

THE UNIVERSITY OF WISCONSIN

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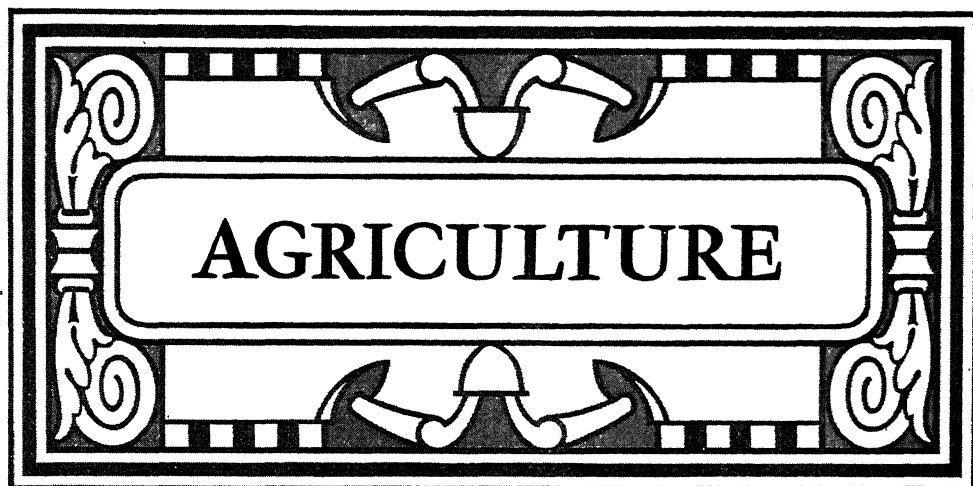
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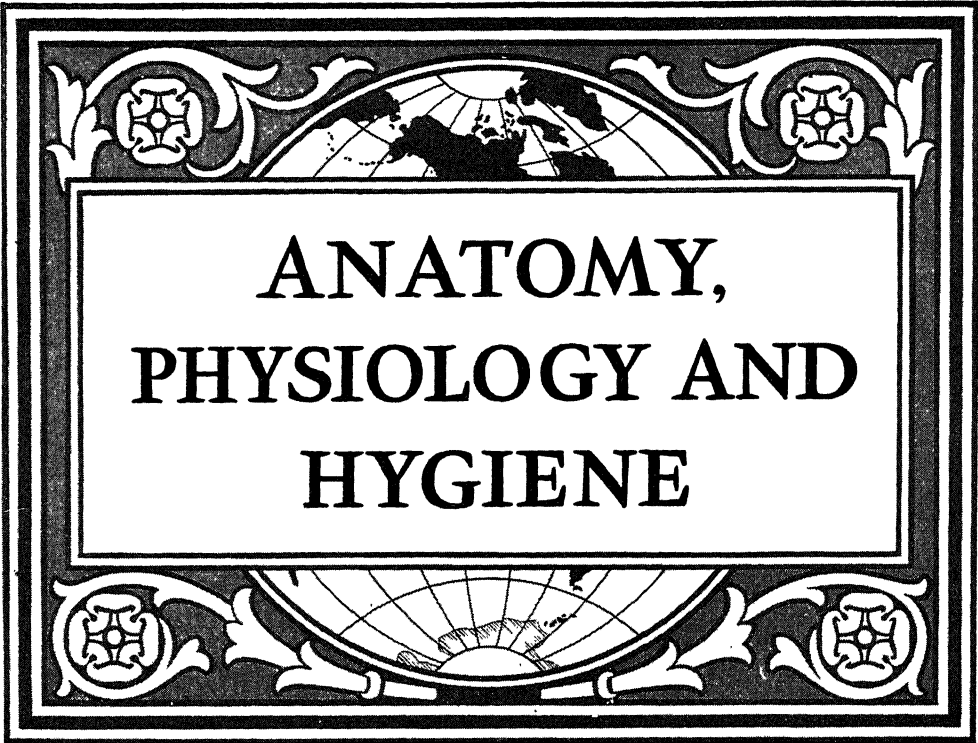
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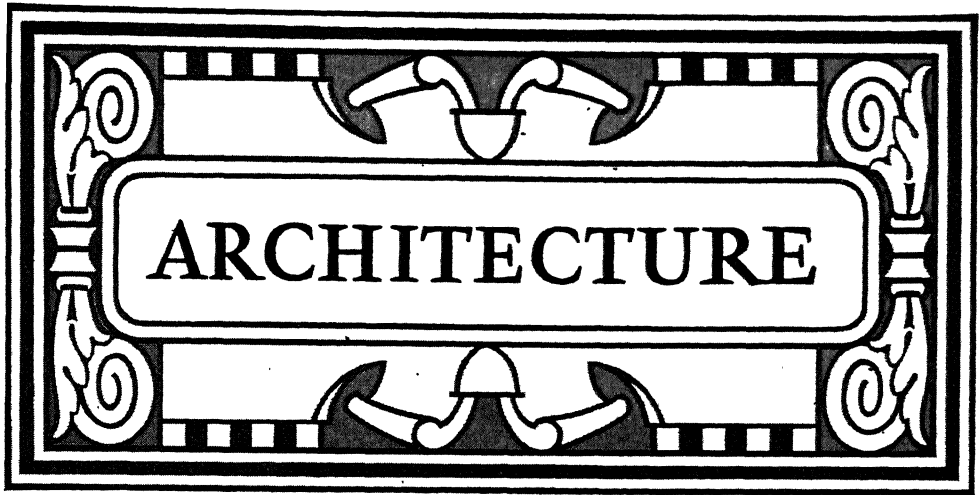
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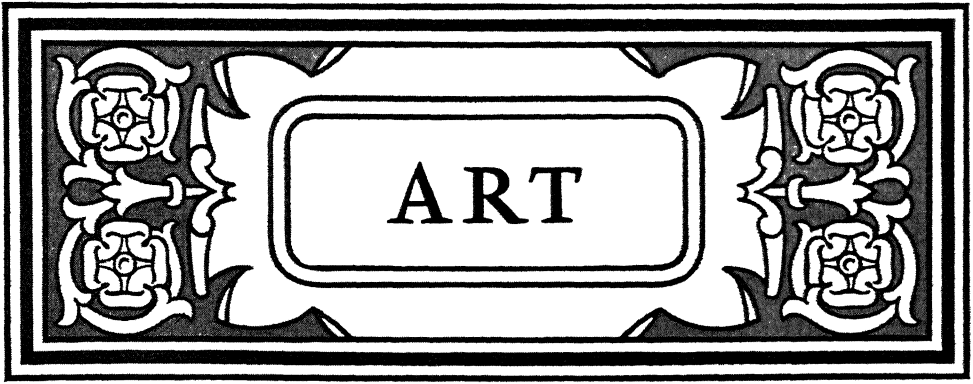
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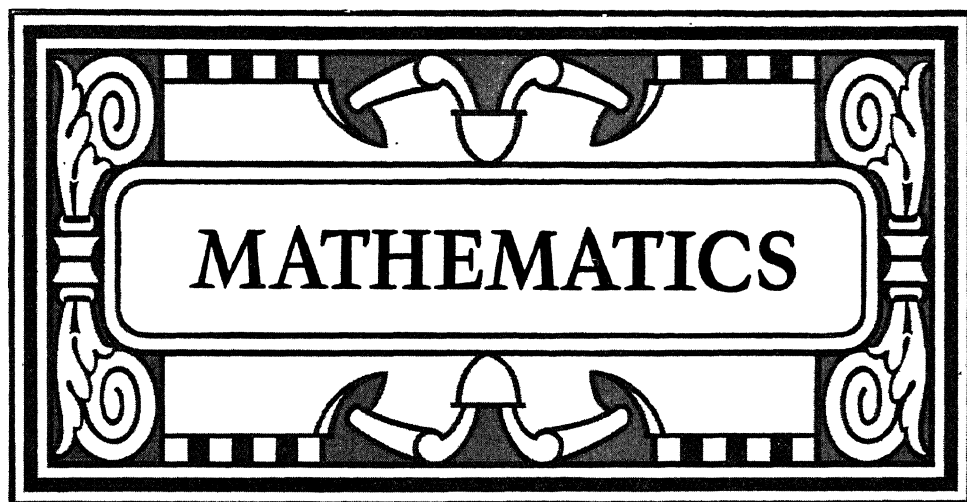
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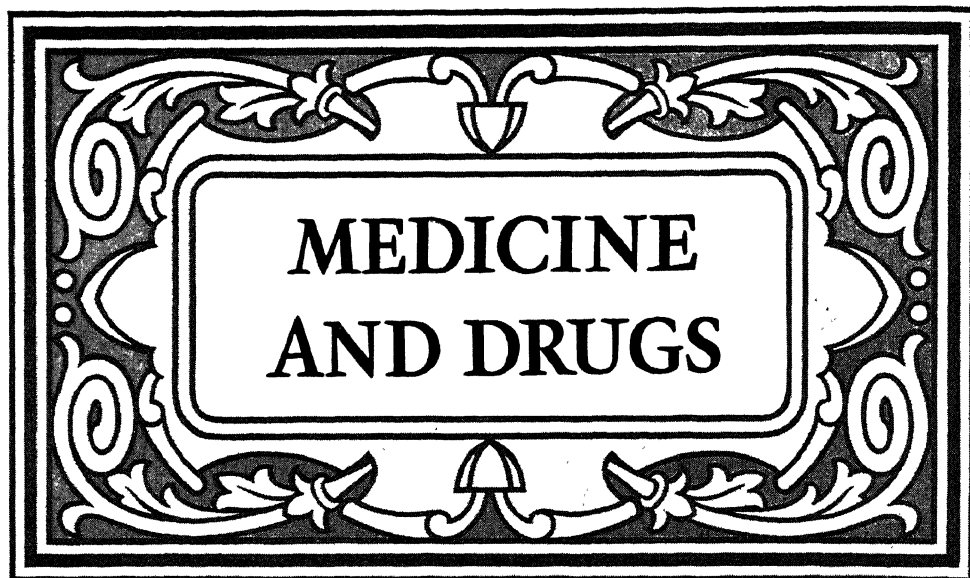
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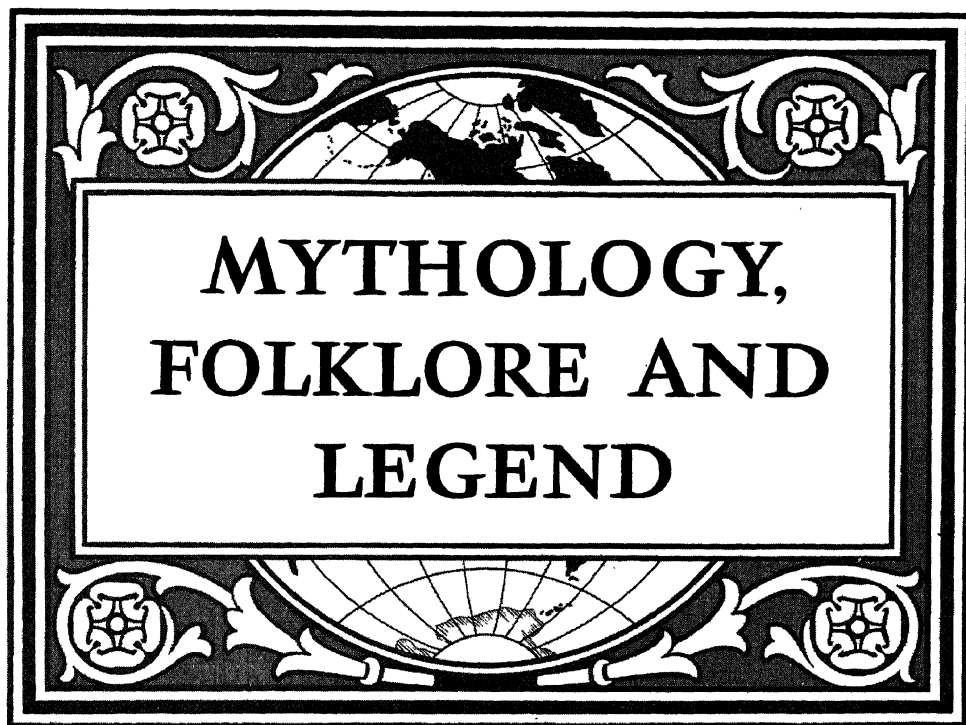
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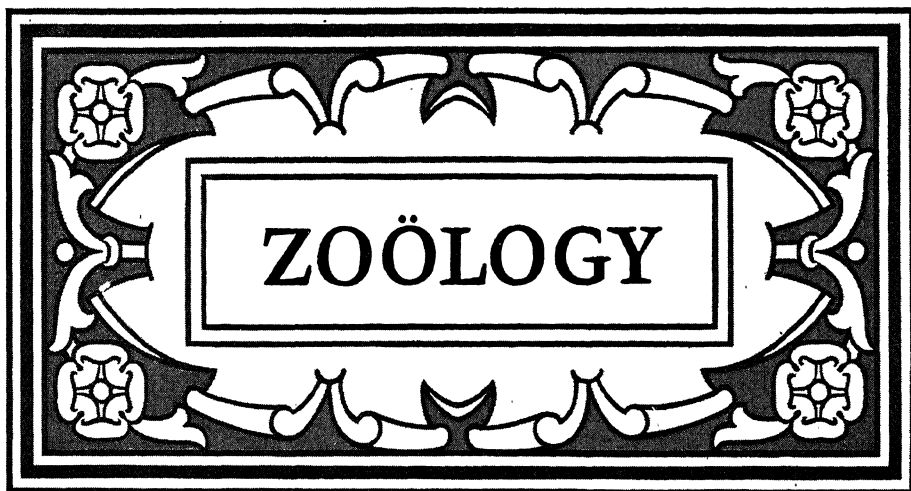
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PART TWO
GUIDE TO STUDY
ILLUSTRATIVE UNITS
OF INSTRUCTION

Preface to PART TWO

THIS section of the Guide volume has been prepared to show how the vast amount of material in THE WORLD BOOK Encyclopedia can be mastered in accordance with modern educational methods. These studies will be valuable to

1. The teacher, for use in connection with required textbooks or courses of study.
2. The student, who can readily follow the lessons without the aid of an instructor.
3. The lay reader, who wishes to refresh or extend his knowledge.

The authors of the several units are outstanding leaders in modern educational thought and are experienced and successful teachers. The lessons have been thoroughly tested in the classroom, especially in the elementary school and the high school of the University of Chicago. Although they represent what is known as the "unit plan" of instruction, they are equally serviceable in connection with the contract plan, the project method, etc. Modern plans of instruction have so much in common that the user may have full assurance that in following the suggestions contained in these units he is complying with the latest and best in educational thought.

The teacher or student who is obliged to follow some special plan or method of instruction will find these studies valuable for organization of subject matter, for the outlines, and for the special devices contained in them.

For years, persistent efforts have been made by educational leaders to base instruction upon logical units rather than upon mere assignments. Originally, the grouping of knowledge around a central idea was designated a "type study." Later terms such as "project" and "problem" came into favor. The *unit plan* is widely recognized as a still further advance in instructional method. The *logical unit* usually requires several lessons for mastery. Details are subordinated and become significant not as facts in themselves, but as steps in the understanding and application of a principle. This places learning on a high plane, making it primarily an affair of intelligence, rather than of memory alone. Not only does the student gain more information, but he remembers it better and is able to use it more effectively. He learns how to study, he becomes able to formulate problems, and he can proceed with their solution by the use of all available material. He acquires power to choose and interpret facts, and is afforded abundant practice in self-expression.

The school program is becoming overcrowded. Selection must be made, or the pupil will be overwhelmed by the great mass of details to be learned. This alone is sufficient reason for the use of large units in instruction in the place of mere lesson assignments. Courses of study and materials of instruction are generally beginning to show the effect of this method.

A more detailed exposition of the unit plan will be found in the introductions to the departments of American History, Community Civics, and General Science in succeeding pages of this volume; also in the article, "Unit Plan of Instruction," by James F. Hosic of Teachers College, Columbia University, in Volume Twelve. These are original contributions to educational literature prepared expressly for THE WORLD BOOK Encyclopedia.

Attention is called to the course in "Character Training," which is an original treatment, adapted for use in either the school or the home. Possibly there is no subject on which parents and teachers will so gladly welcome an organized plan of procedure, nor one on which usable literature is so limited. It is then quite fitting that suggestions for guidance in character training should be included in a publication having the widespread circulation of THE WORLD BOOK Encyclopedia.

M. V. O'SHEA, Editor-in-Chief.

THE UNIVERSITY OF WISCONSIN

GUIDE TO STUDY

ILLUSTRATIVE UNITS OF INSTRUCTION

Social Studies

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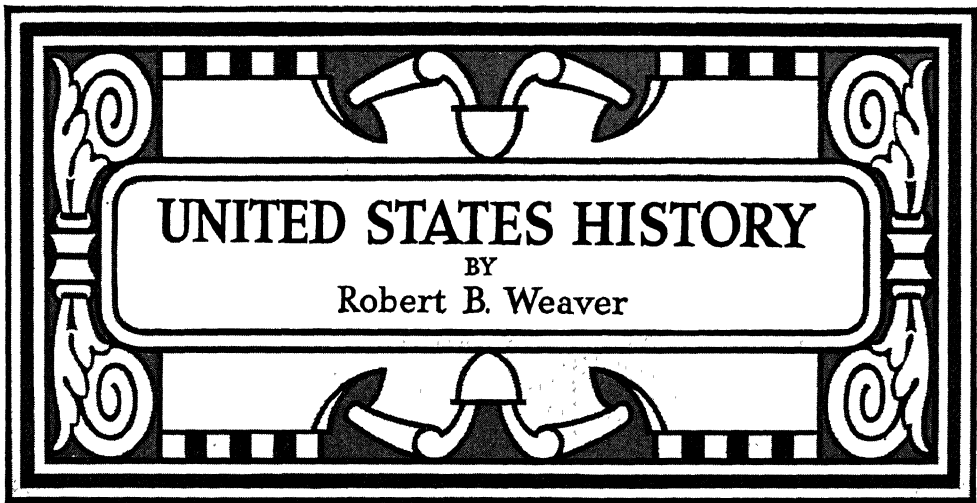
Character Training

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For the Upper Elementary School Grades and the Junior High School

In the selection of materials, authors of history textbooks and makers of courses in history have usually been guided by the encyclopedic principle. An organization of this type almost invariably results in a summarization of the entire record of a nation's past, and dates, persons, and events are included because of the intrinsic value of these items as matters of knowledge or information. The main end of an encyclopedic course is therefore memorization or recall.

The course in United States history which is presented in this volume, however, has been organized in accordance with an entirely different principle. Episodes, persons, and details have been selected which serve to interpret or explain nine significant movements which constitute the units of the course. In an encyclopedic organization, the vast array of facts deal with many subjects; in a course built upon the unitary plan, all the assimilative materials focus upon certain definite aspects of an absorbing story. These materials then become important not for themselves alone, but rather as means to an end, the end being the understanding of the unit. The course has for its goal, then, rationalization or understanding.

An examination of courses of study, textbooks, and manuals published in late years shows that the fundamental difference between a unitary course and a course of the encyclopedic type is often unrealized or ignored. In many of these publications, the terms "unit" and "unitary" occur again and again, but the assimilative material presented under such terminology frequently does not conform to the requirements of a true unitary organization. For example, in a recently published manual, the third unit, "The New Nation Established,"

consists of the following questions with references covering in chronological order the period from 1789 to 1825:

1. What part did Washington play in the establishment of the new nation?
2. What were the chief problems in establishing the government during Washington's administration?
3. Why did political parties develop in the new nation?
4. How did the acquisition of Louisiana Territory strengthen the new nation?
5. In what sense did the War of 1812 establish the prestige of the new government?
6. How did the War of 1812 influence the economic independence of the American people?
7. Show how the Monroe Doctrine strengthened the foreign influence of the United States?
8. What was the new conception of the national government brought out by Webster in his "Reply to Hayne"?
9. How was a new national consciousness indicated by democratic tendencies in politics and religion?
10. In what sense are Irving, Bryant, and Cooper called the first American writers?
11. How did John Marshall strengthen the national government?
12. What are the best well-known evidences of American art up to 1825?

If one may judge from the following nineteen standards which the pupils are expected to attain, the main purpose of this division seems to be to present a rather complete story of a *definite period* of the nation's history for learning or memorizing. The manual states that the pupils are expected, among other things, to be able to give the chief events in the "unit" in narrative form, the names of the first six Presidents, the location of all geographic features listed under map work, the

political and economic results of the War of 1812, and the identification of a large number of dates and terms. It is apparent that the assimilative material for this division was selected in accordance with the encyclopedic principle of organization, that a definite period is to be covered, and that the main end is memorization and recall rather than rationalization and understanding.

Pupils studying a true unit of learning entitled, "The New Nation Established," would not be required to find the present value of the Louisiana Purchase territory, or to show how the original Monroe Doctrine has since been expanded, or to explain the effect of the invention of the cotton gin, or to compare the industrial revolution in America with that in England, or to describe colonial architecture, or to identify Gilbert Stuart, or to learn the date of the prohibition of the foreign slave trade—all of which are required in the instance cited but all of which are foreign to the theme suggested by the title of the unit. The title, indeed, indicates a genuine unitary conception, but the details selected for study are in many instances irrelevant or are unrelated to the "unit."

In many courses of study which purport to be unitary, neither the titles nor the contents of so-called "units" are unitary in character. Such is the case in a recently published course of study in which one of the "units" is entitled "The English Colonies in America." The title suggests a stage or period of the nation's history which, apparently, is to be covered. The block of material proposed for study consists of the following series of topics: (1) "Why Europeans Wanted to Come to America," (2) "Ignorance of Conditions in America," (3) "The Settlement of Virginia," (4) "The Story of the Pilgrims and the Beginning of Massachusetts," (5) "Other New England Colonies," (6) "The Middle Colonies," (7) "Colonies South of Virginia," (8) "How People from Many Countries Became Americans," (9) "The Colonies and the Mother Country," (10) "Various Industries in the Colonies," (11) "How Different Governments Developed in the Colonies," and (12) "Life in the Colonies." These topics indicate that the pupils are to study all the colonies in all their aspects. There is no indication that the course-builder attempted to incorporate only such assimilative material as would interpret a *single* significant and comprehensive aspect of some field of knowledge.¹

The true meaning of the term "unit" apparently is misunderstood. Professor H. C. Morrison states that "the critical difference

between a true unit of learning and a mere chapter heading is the difference between a significant and comprehensive aspect of the environment, or of a science, which can be understood and a mere division of descriptive or expository subject matter which cannot be understood except in relation to other chapters which themselves stand in isolation."²

It is in accordance with the interpretation of the unitary principle as set forth in the preceding paragraphs that the following course in United States history has been planned. The course is a modification of a unitary course prepared in the Laboratory School of the University of Chicago by Dr. H. C. Hill and the writer and is adapted to THE WORLD BOOK. Each of the nine units consists of five major divisions: (1) a list of exploration questions; (2) a unit analysis; (3) assimilative material; (4) study directions; and (5) a test in understanding. A brief consideration of each of these divisions follows:

(1) The use of exploration questions to determine the apperceptive basis of pupils for a new unit has become quite general among teachers of the social studies. In meeting his new class, the teacher's first task is to discover just how far the pupils have advanced in the subject, for the highest degree of success in teaching can be attained only when the teacher knows what knowledge and understanding the pupils already possess. Teachers who desire "to teach individuals rather than subject matter" use factual and understanding exploration questions to determine the pupils' previous preparation for the new unit of learning.

A list of exploration questions is given at the beginning of each unit of the course in United States history which follows for the use of the teacher in determining the apperceptive mass of his pupils. Each list of exploration questions is merely suggestive of the type of questions that may be asked before instruction is undertaken. Some of the questions may be omitted if the teacher so desires, and other questions which appear to him to be necessary may be added. Pupils should be assured that their answers to these exploration questions will have no bearing upon their final grades or marks; that the questions are asked solely for the purpose of providing the teacher with evidence concerning their preparation for the new unit in order that he may teach more wisely and intelligently. The questions may be answered orally by the pupils, but written answers from each pupil will provide the teacher with more objective data.

In order to study the exploration test scores, the following record sheet has been employed

¹The preceding discussion is adapted from an article (by Dr. Howard C. Hill and Robert B. Weaver) which appeared in *The School Review*, XXXVII, No. 4.

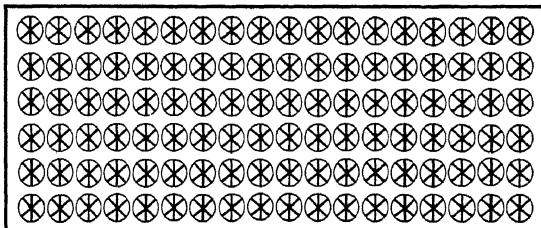
²Henry C. Morrison, *The Practice of Teaching in the Secondary School*, p. 177. Chicago: University of Chicago Press.

Cover-the-Ground - content important for itself alone

1492

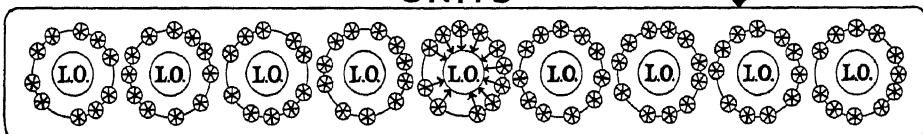
To-day

STOREHOUSE OF KNOWLEDGE AND INFORMATION



Unitary—
content important as
means to an end

UNITS

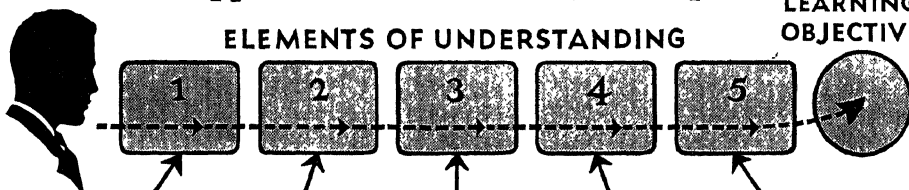


PUPIL

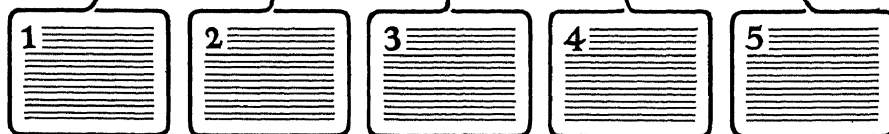
Application of the Unitary Principle

LEARNING
OBJECTIVE

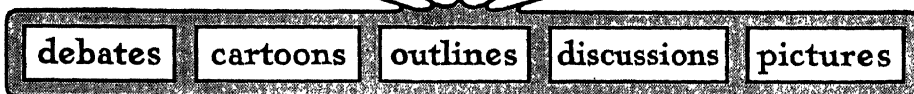
ELEMENTS OF UNDERSTANDING



ASSIMILATIVE MATERIAL (SUBJECT MATTER)



STUDY ACTIVITIES



EXPLANATION OF THE DIAGRAMS

Above, the diagram illustrates two principles of organization. When the encyclopedic principle is followed, and *ground is covered*, dates, persons and events are included because of the intrinsic value of these items as matters of knowledge or information. When the unitary principle is followed, only subject matter is included which contributes to an understanding of the learning objective in each of the units constituting the course.

Below, subject matter (assimilative material) is made the basis of study activities (outlines, debates, discussions, etc.) the preparation of which enables the pupil to understand the elements and arrive at the learning objective.

with success by many teachers. The column "Number Wrong" indicates the apperceptive basis of each pupil for the new unit, and the column totals indicate the phases of the new unit which are most generally understood by the class, and the phases of the new unit which are the least understood. A teacher cannot help but do better work in the classroom after he has studied the data compiled in a record sheet of this type. Exploration questions may be used later in the unit as check-up questions for review purposes, or may be used as final test questions.

PUPIL'S NAME	QUESTIONS															No. Wrong
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
A.....	x	x		x	x	x		x		x	x		x	x		10
B.....		x		x		x	x	x		x	x	x		x	x	10
C.....	x	x	x	x		x		x		x		x	x	x		13
D.....				x	x		x	x			x	x		x		7
E.....		x		x	x				x			x			x	6
F.....		x		x	x	x			x			x	x			9
G.....				x	x						x			x	x	5
H.....	x	x	x	x	x	x	x	x	x	x	x	x		x		14
I.....	x			x	x	x					x	x			x	7
J.....	x			x	x		x					x			x	6
K.....	x	x	x	x		x					x	x			x	9
L.....	x			x			x				x	x		x	x	7
M.....	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	15
TOTAL	8	8	4	12	11	6	10	6	4	5	10	11	5	7	11	118

(2) The analysis of each unit appears immediately below the list of exploration questions for the unit. The analysis consists of a learning objective and elements of understanding. The learning objective is a statement in generalized form of the main learning product, intellectually considered, that is desired in a particular unit of learning. The learning objective represents the adaptation which the pupils are expected to make as a result of their study. The elements of understanding are statements in generalized form of the minor understandings which the pupils are expected to acquire as a result of their study. If the study of a unit is likened to a journey or a trip, the elements of understanding may be thought of as the route which is traveled, and the learning objective as the destination. Each analysis is presented as a matter of faith, to some extent, for in no case have the learning objective and the elements of understanding been definitely determined objectively.

Until scientific research has been employed to determine the analysis of a unit, the teacher must assume that the elements of understanding which he uses are the adaptations which will most likely result in the attainment of the learning objective. Only after investigation and experimentation can the course-builder or teacher be certain that an analysis of a unit is superior to other possible analyses of the same

subject of study. What one person considers the learning objective desired in a particular subject of study may be considered by other persons as too difficult, too broad in scope, or too specialized.

When such differences arise over the learning objective, even less agreement may be expected upon the minor understandings to be developed in arriving at the adaptation indicated in the learning objective. Disagreement must be expected until all possible analyses of a given unit have been made, and the educative value of each determined. This, of course, involves teaching a unit analyzed in different ways, and determining the value to the pupils of the different analyses. The essential point is not that agreement must be reached, but rather that a defensible analysis be made before instruction is undertaken.

The analyses given in this course may be modified at the discretion of the teacher by omitting certain elements, by combining elements, or by adding elements which appear to the teacher to be essential. If the teacher desires to give a presentation of the new unit to the pupils, he should follow the analysis in his discussion, and if the pupils are then required to write a presentation paper indicating the intellectual route which is to be followed and the destination, they, too, should follow, in general, the unit analysis.

(3) The subject matter which the pupils are expected to study is given in the third division of each unit under the title "Assimilative Material." The divisions of content indicated in the Assimilative Material correspond to the elements of understanding as outlined in the analysis of the unit. The selection of assimilative material for a unit will be more intelligent if the items are determined upon after the learning objective and elements of understanding are formulated, for the material is then chosen to illuminate the analysis, and is more likely to be illustrative in character than to be material chosen for itself alone. The assimilative material has been selected for its value in illuminating a historical movement, that is, as a means to comprehension. The items included should be thought of as means to an end, not ends in themselves.

(4) Exercises which the pupils are expected to prepare are listed in each unit under the title "Study Activities." The assimilative material of the unit is used in preparing imaginary and historical themes, cartoons, diagrams, debates, charts, outlines, and tabulations. Educators are severe in their criticism of busy-work exercises which appear in many textbooks at the ends of chapters, but no one questions the use of exercises which are planned after a unit analysis has been determined and which focus definitely upon some phase or phases of that analysis.



Application of the Unitary Principle

ELEMENTS OF UNDERSTANDING

1. The new government solved difficult financial problems.
2. The new government enforced its laws in spite of armed opposition.
3. The new government maintained its neutrality during a world war regardless of determined efforts to bring it into the struggle as the ally of one of the combatants.
4. The new government survived the conflicts of rival political parties.
5. The new government stood the strain of a foreign war in spite of internal opposition.

During the first twenty-five years of its existence the national government was tested by serious difficulties which it successfully overcame.

ASSIMILATIVE MATERIAL (SUBJECT MATTER)

1. Finance: Financial problems—debt, of the new government—debt, current expenses, income; Hamilton's proposals—foreign debt, domestic debt, tariff.
2. Law and order: Collection of Federal taxes—tariff, whiskey; attitude of the West on whiskey tax; Whiskey Rebellion—causes, chief incidents, action of national government, significance.
3. Neutrality: European war; the people—finance, interpretation of the Constitution, European affairs: Federalists in power—Alien and Sedition Laws; Virginian and Kentucky Resolutions; election of 1800.
4. Political parties: Views of the Barbary pirates; war with England (1812)—causes, military events (invasion of Canada, Perry on Lake Erie, the Constitution and the Guerriere, blockade on the Atlantic coast, burning of Washington, Battle of New Orleans); internal opposition—Hartford Convention; results of the war.
5. War: Quasi-war with France; the Barbary pirates; war with England (1812)—causes, military events (invasion of Canada, Perry on Lake Erie, the Constitution and the Guerriere, blockade on the Atlantic coast, burning of Washington, Battle of New Orleans); internal opposition—Hartford Convention; results of the war.

STUDY ACTIVITIES

1. Indicate in a discussion of at least two pages how the new government solved difficult financial problems. a. Alexander Hamilton, 3025-3026. b. National Debt, 4814. c. Internal Revenue, 3482-3483. d. George Washington, 7653. e. Bank of the United States, 602. 2. How was the Whiskey Rebellion a test of the new government? Be prepared to discuss this question in class. 7742, 2666, 7654. 4. Do you think that Washington acted wisely in issuing a proclamation stating that America would remain neutral? Indicate in a short paragraph how Washington might have reasoned in arriving at the conclusion that the new nation should stay out of entangling European alliances. 6. The following references show that the new government survived the conflicts of rival political parties. Prepare a sentence outline of this division of the unit, and be prepared to discuss in class the part of the outline which you think most significant in showing the activities of the two major parties. The references for exercise 3 should be reviewed before the outline is made. a. History of Political Parties in the United States, 5705. b. Democratic Party, 1888-1889. c. Aaron Burr, 1037. d. Alien and Sedition Laws, 221. e. Anti-Federalist Party, 310. f. Federalist Party, 2390. g. Jefferson, Secretary of State and Vice-President, 3648. h. Election of 1800, 3648-3650. i. Alexander Hamilton, 3026. j. Virginia and Kentucky Resolutions, 3765. k. Death of the Federalist Party, 4202. 9. Read the account of "The War of 1812," on pages 7601-7606, and prepare a topical outline of this material. Using your outline as a guide, write a comprehensive story of this phase of the unit, indicating how the war tested the new government.

Each exercise involves the use of essential assimilative material, and is in no way a lesson-learning assignment. Certain exercises may be omitted, if the teacher thinks too much work has been assigned, but care should be taken not to omit all of the exercises which are focused upon a particular element of understanding. As a rule, there are at least two exercises which are expected to bring about an understanding of each element of the unit.

(5) A test in understanding of the multiple-choice type is given at the end of each unit. Four possible answers to each question are given, and the pupils are expected to place a cross (x) before each correct answer and a question mark (?) before each debatable answer. The incorrect answers are not to be marked in any way. If the teacher desires, he may require the pupils to write two or three sentences immediately below each question, and justify his selections. Pupils should not expect to find one correct, one incorrect, and one debatable answer to each question. In some cases, two of the four answers given to a question are correct, and two answers are debatable. In some cases, one answer is correct, one is debatable, and two are incorrect. In fact, all possible combinations of answers are provided, and the pupils should be cautioned against expecting any particular combination.

The test questions for a particular unit are focused upon the analysis of the unit, rather than upon the assimilative material, and are, consequently, understanding questions. Many of the exploration questions are focused upon the assimilative material and are informational in character; but the final test questions develop the pupils' *understanding* of the unit. If

a pupil has not mastered the unit when he takes the test (which will be indicated by his low test score), he should be required to read additional accounts, prepare additional exercises, and take another test in understanding within a few days. The pupils who pass the test in understanding with perfect scores (indicating that they have mastered the unit) are ready to prepare an organization of the unit, and write a recitation paper or give a floor talk.

In organization, each pupil is required, without the use of books, notebooks, or helps of any kind, to make a complete analytical outline of the unit. In writing a recitation paper, or in giving a floor talk, a pupil should present everything he knows about the unit, and should be given as much time for his presentation as he desires. Each pupil should be required to write a recitation paper or give a floor talk for each unit in which the *complete* story of the unit is related.

[A complete description of the Five-Step Procedure of teaching, which has been somewhat modified in the preceding paragraphs, is presented by Professor H. C. Morrison in *The Practice of Teaching in the Secondary School*.]

Before the unitary course which follows is studied, pupils should read the "Summary of United States History," pages 7389-7409 in *THE WORLD BOOK*, to become acquainted with the principal events of our nation's history in the order of their occurrence and to understand the scope of this course. When this has been done, the pupils should be ready to study Unit One, which follows. The units of the course are presented, without further introduction, in the order in which they should be studied.

UNIT ONE

How We Became Americans

Exploration Questions

1. What was the real motive back of Columbus's desire to cross the ocean?
2. Why did the Pilgrims leave England and Holland to come to the New World?
3. Why did James Oglethorpe bring people to Georgia?
4. What effect did the stories of Marco Polo, Christopher Columbus, and Henry Hudson have on the people of Europe? What were these stories?
5. What are the chief reasons that caused people from Europe to journey to America during the seventeenth century?
6. Of what significance in American history was the capture of Constantinople by the Turks?
7. What did Columbus know about Marco Polo's travels, and how did this influence him?
8. How did the immigration to America change during the latter part of the nineteenth century?
9. How do you account for Columbus's voyages and Hudson's first visit to America?
10. Were the achievements of Columbus and Hudson greater or less than they had expected? Explain.
11. How was life in Europe in the seventeenth century growing hard? How did this affect the history of America?
12. What conditions existed in America during the years preceding the American Revolution that caused Europeans to come to its shores?
13. Explain the influence of European and

American writers in causing people to migrate to America?

14. What was the chief nationality of the American colonists before the Revolutionary War?
15. What nationalities were represented in each of the original thirteen colonies before the Revolution?
16. What kinds of people were represented in the Northern, Central, and Southern colonies from the Revolution to approximately 1880?
17. What were the approximate percentages of the various nationalities living in the United States in 1800, in 1880, in 1900, in 1920? What is the condition to-day?

Analysis of the Unit

LEARNING OBJECTIVE

Since the beginning of settlement, immigrants from many lands have come to America, and as a result the American people are a composite nationality.

ELEMENTS OF UNDERSTANDING

1. From the beginning of settlement, immigrants have settled in America to escape religious persecution, to be free from political oppression, to make money, and to improve their living conditions.
2. The early settlers were largely from Great Britain.
3. During the century following the American Revolution, the immigrants were largely from the countries of Northwestern Europe, but during the last fifty years many have come from Southeastern Europe and Western Asia.
4. Americans have become a composite people through intermarriage, through common institutions, through westward movements, and through common traditions.

Assimilative Material

1. Why white people first came to America: Commerce, Marco Polo, Christopher Columbus, Henry Hudson; religion, the Pilgrims; oppression, James Oglethorpe and Georgia.
2. Kinds of people who came: the settlers at Jamestown; the colonists of Massachusetts; the different nationalities in South Carolina, Delaware, Pennsylvania, New York; the chief nationality in the colonies.
3. Migrations from Europe since the American Revolution: Incomers from Northwestern Europe to 1880—from England, Germany, Ireland, Scandinavian countries; incomers from Southeastern Europe and Asia since 1880—from Italy, Austria,

Hungary, Poland, Russia, Serbia, Greece, Roumania, China, and Japan.

4. The present population: This class; this school; this district; this city; this state; the United States.

Study Activities

[Numbers refer to pages in THE WORLD BOOK Encyclopedia.]

1. After reading the story of Marco Polo, 5714-5716, 3818, the story of Christopher Columbus, 1572-1577, 5077, and the story of Henry Hudson, 3270-3273, write a paper of at least two pages comparing the influence of these three men in causing people to come to America. Remember, the only parts of the three stories that you care about at this time are the parts which indicate how these three men caused people to come.
2. Read about the Pilgrims, 5615-5616, 4331-4332, and be prepared to write one clear, concise sentence on the blackboard which summarizes this story. The story of the Puritans, 5887, and the story of the Quakers, 5901-5902, may be read to supplement the major assignment.
3. Indicate in a brief discussion whether you think commerce or religion was more important in causing people to settle in the New World.
4. How do the accounts of James Oglethorpe in Georgia, 2759-2762 and 5166-5167, relate to the story of this unit? Be prepared to show the exact relationship of this material to the subject of study.
5. Prepare a diary which might have been kept by a member of the debtor class who sailed for America with Oglethorpe.
6. Read the following accounts and write a comprehensive description of the kinds of people who came to the colonies before the American Revolution. Remember that *kinds* refers to nationality, personality, character, disposition, and occupational activity.
 - a. History of Massachusetts, 4331-4332.
 - b. Massachusetts Bay Colony, 4335.
 - c. Jamestown, 3615-3616.
 - d. History of South Carolina, 6711-6713.
 - e. History of Delaware, 1880.
 - f. Early History of New York, 4976.
 - g. History of Pennsylvania, 5470.
 - h. Immigration, 7367-7368.
7. To test your ability to find reference materials, locate other accounts in THE WORLD BOOK which indicate the kinds of people who came to America before the American Revolution.
8. Does the account of "Colonial Life in America," 1545-1550, give you any indication of the chief nationality in the

colonies? Be prepared to defend your position on this question.

9. After reading the following accounts, make a tabular chart indicating as many differences as you can between the people who came before 1880 and those who came since 1880. Devote one column to the immigration before 1880 and one column to the immigration since 1880.
 - a. The People of the United States, 7367-7368.
 - b. Immigration in the United States, 2224-2226.
 - c. A Citizen of the United States, 1435-1436.
 - d. Chinese Exclusion, 1402.
 - e. Oriental Emigration to California, 1095-1097.
 - f. Edward Bok, 816.
 - g. Carl Schurz, 6431.
10. Pages 2225-2226 indicate the large per cent of foreign-born population. In the discussions of many of the states, you will find a division entitled "Its People." Read as many of these accounts as you think profitable, and make a chart indicating the nationalities which make up the present population. Discussions of the larger American cities also give materials dealing with the question of population. Consult some of these references. Make a survey of your class, your school, and your school district to determine more about the nature of our melting pot.

A Test in Understanding

Place a cross (x) before each correct answer to a question and a question mark (?) before each answer which is debatable. Be prepared to justify your selections:

1. What was the chief reason people first came to America?
 - a. Love of pleasure.
 - b. Desire for wealth.
 - c. Ambition for conquest.
 - d. Love of adventure.
2. What conditions in the Old World caused people to leave their native country?
 - a. All property was owned by the government.
 - b. The land was poor and hard to cultivate.
 - c. Governments discouraged commerce.
 - d. Governments oppressed people.
3. What was the policy of European governments that caused this emigration?
 - a. Refusal to permit people to dress as they desired.
 - b. Refusal to permit people to control the selling prices of their goods.
 - c. Refusal to permit people to worship as they desired.

- d. Refusal to permit public gatherings for the purpose of amusement.
4. How did the Turks influence people to come to America?
 - a. They founded a colony in the New World.
 - b. They published books telling about the New World.
 - c. They captured Constantinople.
 - d. They gave young oppressed Turks their freedom.
5. What was the chief nationality of the early settlers?
 - a. The French colonists far outnumbered all other nationalities.
 - b. The English were in the majority, but there were many Swedes, Dutch, French, and Germans.
 - c. The Spanish were the chief peoples in the early colonies.
 - d. The Dutch were the chief colonists, but there were many Englishmen, Spaniards, Germans, and French.
6. How has emigration to America changed during the last one hundred fifty years?
 - a. Previous to 1880, most immigrants reached America from the countries of Northwestern Europe; since 1880, many have come from the countries of Southeastern Europe and Western Asia.
 - b. Previous to 1880, most immigrants came from Italy, Austria-Hungary, and Russia; since 1880, the majority have come from Great Britain, Ireland, and Germany.
 - c. Previous to 1880, most immigrants came from Great Britain, Ireland, Russia, and Germany; since 1880, the majority have come from Ireland and Austria-Hungary (now Austria and Hungary).
 - d. The immigration since 1880 has been the same as the immigration before 1880; there has been no important change during the past one hundred fifty years.
7. Why did most people who came to America after the Revolution settle in the North?
 - a. They desired to be near the Great Lakes.
 - b. They were driven to the Northern coast by ocean currents.
 - c. They did not like the climate of the Southern states.
 - d. They wanted to be away from slave labor.
8. What type of immigrants before the Revolution was the most numerous?
 - a. The nobility.
 - b. Negro slaves.
 - c. Indentured servants.
 - d. Middle class.

9. During what periods have the largest numbers of immigrants arrived?
 - a. Before the American Revolution.
 - b. Between 1880 and 1920.
 - c. Between the American Revolution and 1850.
 - d. Since 1920.
10. What is the present attitude of most of the people of the United States toward immigration?
- a. They think that immigration should be greatly restricted.
- b. They think that immigration should not be restricted.
- c. They think that only immigrants from Southeastern Europe should be permitted to enter the United States.
- d. They think that the immigration question should be decided by the states rather than by the national government.

UNIT TWO

Why We Have English Institutions

Exploration Questions

1. What parts of North America were claimed by the different Indian tribes?
2. How did the voyages of Columbus give Spain a claim to the New World?
3. How did Pope Alexander strengthen Spain's claim to the New World?
4. How did Ponce de Leon strengthen Spain's claim to the New World?
5. What were England's claims to the New World?
6. By what right did the Dutch claim North America?
7. What territory did Cartier, Champlain, Marquette, and La Salle claim for France?
8. What stirred up the wrath of Spain which prompted the use of the "Invincible Armada" against England?
9. Why was England able to defeat the Armada?
10. In what way did the destruction of the Armada decide the destiny of America?
11. What was the attitude of the people of New Amsterdam toward Peter Stuyvesant?
12. How was New Amsterdam taken by the English?
13. Of what significance was the taking of New Amsterdam by the English?
14. Were the English or the French the aggressors in the early conflicts before the French and Indian War?
15. Why did the English desire to take Port Royal and Quebec?
16. What was the purpose of Washington's expedition to Fort Duquesne? What was the result?
17. What was Braddock assigned to do?
18. Why did Braddock's campaign fail?
19. What changes did William Pitt make in the conduct of the French and Indian War?
20. What major task did Pitt assign to General Wolfe?
21. How did the last stronghold of the French in America pass into the hands of the English?
22. In what ways were Montcalm and Wolfe alike? In what respects were they different?
23. What disposition was made of North America by the Treaty of Paris? What countries controlled territory by terms of the treaty?
24. Did England or France have more people in America at the beginning of the French and Indian War? What was the approximate difference in number?
25. How did English and French settlements differ, from a geographical standpoint?
26. What effect did the nature of the industries in America have upon the conduct and outcome of the French and Indian War?
27. Were the French or the English colonists better trained in self-government? What effect did this have upon the conduct of the war?

Analysis of the Unit

LEARNING OBJECTIVE

American institutions originated in England and, due to England's victory in the struggle for North America, have continued to be English, with modifications, to the present time.

ELEMENTS OF UNDERSTANDING

1. By 1600, several European countries had conflicting claims in North America.
2. England defeated Spain and Holland during early struggles for the control of the New World, but was unable to defeat the French for many years.
3. England established its supremacy in the New World by defeating France in the French and Indian War.
4. The English were victorious in North America due to conditions in Europe and in the New World.
5. The majority of American institutions resemble those of England.

Assimilative Material

1. Early claims to North America: Indian; Spanish, Columbus, Pope's decree, Ponce de Leon; English, the Cabots, Raleigh; Dutch, Henry Hudson; French, Cartier, Champlain, Marquette, La Salle.
2. Early struggles for the control of the New World: Destruction of the Spanish Armada; defeat of the Dutch; early conflicts between the French and the English.
3. The French and Indian War: Washington's expedition to Fort Duquesne; Braddock's campaign; William Pitt; Montcalm and Wolfe; fall of Quebec; treaty of Paris.
4. Why England won North America: Superiority of population in the colonies; character of settlements; nature of industry; character of government.
5. Institutions in America: English language; government; ideas of freedom and law; customs; methods of thought; attitudes toward life.

Study Activities

[Numbers refer to pages in *THE WORLD BOOK Encyclopedia*.]

1. Read the following accounts of the early claims to North America, and make an analytical outline showing the major claims of the European nations and of the North American Indians.
 - a. Indian Families and Tribes, 3409-3428.
 - b. America Discovered, 1573-1575.
 - c. Line of Demarcation, 1887.
 - d. Ponce de Leon, 5725-5726.
 - e. John Cabot, 1063.
 - f. Sir Walter Raleigh, 5991.
 - g. The Lost Colony of Virginia, 1827-1828.
 - h. Henry Hudson, 3270-3271.
 - i. Jacques Cartier, 1220-1221.
 - j. Samuel de Champlain, 1301-1302.
 - k. Jacques Marquette, 4298-4299.
 - l. La Salle, 3882-3884.
 - m. History of Canada, 1137-1139.
2. Consult the "List of Explorers" on page 747; select those whose explorations illuminate this unit, and read the accounts of their expeditions.
3. Be prepared to give a floor talk on the early conflict between the English and the Spanish for the control of the New World, 405-406, 2022.
4. Imagine yourself an English sailor in the fleet which destroyed the Invincible Armada, and write an account of what took place. Your account will be imaginary, but it must have an historical foundation. Be certain to relate the facts as they were at that time.
5. In an account of the "Early History of New York," 4976, 4994, and in an account of "Peter Stuyvesant," 6883, you will find material dealing with the early conflict between the English and the Dutch for the control of the New World. Read these accounts, and write a discussion of this story.
6. The following accounts tell about the first conflicts between the English and the French for the control of North America, and describe the French and Indian War. Prepare an outline of this material, devoting one major division to the early conflicts, and one to the war itself.
 - a. History of Nova Scotia, 5101.
 - b. The Struggle for New France in Canada, 1139.
 - c. Robert Dinwiddie, 1953.
 - d. The story of the French and Indian Wars, 2607-2609.
 - e. Fort Duquesne, 2544.
 - f. Edward Braddock, 915.
 - g. Blockhouse, 796.
 - h. Comte Louis Frontenac, 2627-2628.
 - i. James Wolfe, 7818-7819.
 - j. Battle of Quebec, 5917-5918.
 - k. Montcalm, 4619.
7. Be prepared to explain why England won North America following the fourth division of the outline (Assimilative Material) included in the third part of this unit. Be certain that you understand the last item, "character of government."
8. Write a paper supporting either side of each of the following questions:
 - a. The English sea-rovers are to be admired.
 - b. England had the strongest claim to the New World.
 - c. If there had been as many French in the New World as English, France would have won the French and Indian War.
9. Write a short paragraph showing how Unit One is related to Unit Two. Indicate why the story of exploration appears in the first rather than the second unit.
10. In a three-page discussion, defend the following statement or show that it is incorrect: "Our language, our government, and the way we look at life are, to a large extent, similar to the views held by the English." A class discussion of this question will precede your writing.
11. Perhaps you have come across some subject during the study of the unit which appeals to you and you desire to prepare a voluntary project. The procedure given below will be suggestive, and should enable you to do a good piece of work. If projects are prepared during

the study of succeeding units, the same general plan should be followed.

- a. First choose a subject which does not have too great a scope—one which can be developed in great detail. The lists of "Related Topics" included at the conclusion of the various articles referred to should prove suggestive.
- b. Read a story which you think covers your subject in a general way.
- c. Make a brief outline of the story you propose to develop, and submit it to the instructor. After you have revised the outline, with the help of the instructor, you should be ready to begin active work on the project.
- d. Read all of the accounts which are available and take notes. At the conclusion of many accounts in *THE WORLD BOOK* we repeat again that you will find the lists of "Related Subjects" very helpful. Two kinds of notes should be taken and, in order to keep them separate, should be written on different colored cards. Notes which are written in your own words should be written on white cards; notes which are exact quotations should be written on buff cards, or cards of some other color, to distinguish them from the white.
- e. After the reading has been completed, review the notes very carefully.
- f. You should now be ready to write the project. In writing the account, consult the buff cards only. This will mean that you must understand the story as it is described on the white cards.
- g. Check what you have written against the notes, both buff and white, read again very carefully, and correct any errors which you have made.
- h. Rewrite the project. It must be understood that a finished piece of work presupposes planning, organizing, reorganizing, collecting materials, writing, rereading, revising, and *rewriting*.

A Test in Understanding

Place a cross (x) before each correct answer to a question and a question mark (?) before every answer which is debatable. Be prepared to justify your selections:

1. What people claimed North America on the ground that they were the first to occupy the land?
 - a. The French.
 - b. The Indians.
 - c. The Negroes.
 - d. The English.
2. What was the basis for Spain's claim to the New World?

- a. The voyage of John Cabot, and the discovery of Columbus.
- b. The promise of the Indians to give New England to Spain, and the voyage of Raleigh.
- c. The voyages of Columbus and Ponce de Leon and the decree of the Pope.
- d. The promise of Henry VII of England that the English claims to the New World would be withdrawn.
3. What was the basis for England's claim to the New World?
 - a. The voyages of the Cabots and Raleigh.
 - b. The explorations of Henry Hudson, and the decree of the Pope.
 - c. The explorations of La Salle, Champlain, and Marquette.
 - d. The promise of the Indians to give the Atlantic seaboard territory to England.
4. What was the basis for France's claim to the New World?
 - a. The destruction of the Spanish Armada.
 - b. The explorations of La Salle, Champlain, and Marquette.
 - c. The promise of Ferdinand and Isabella of Spain that the Spanish claims would be withdrawn.
 - d. A decree of the Pope conferring the region upon France.
5. What established the naval supremacy of England?
 - a. The defeat of the Dutch at New Amsterdam.
 - b. The conflict with the Spaniards in Florida.
 - c. The destruction of the Spanish Armada.
 - d. The conflict with the French in Carolina.
6. What caused the downfall of the Dutch in the New World?
 - a. The conflict with the Spanish in Florida.
 - b. The conflict with the French in the region of the Great Lakes.
 - c. The English-Dutch wars in Europe, and the consequent occupation of New Amsterdam by the English.
 - d. The battle with the Iroquois Indians near Detroit.
7. What was the nature of the early conflicts between the French and the English for the control of North America?
 - a. England and France encouraged their Indian allies to attack frontier settlements.
 - b. England and France fought naval battles off the coast of Virginia.
 - c. England and Holland opposed France and Spain in the region of the Saint Lawrence River.
 - d. France and England brought their arguments before the Pope, with the hope that he would adjust the differences.

8. What change in the conduct of the French and Indian War explains the final British success?
 - a. The French decided to leave the forts which they had built.
 - b. William Pitt became Prime Minister of England and reorganized the army.
 - c. The English sent Washington on a mission to tell the French that they were building on British territory.
 - d. The English changed their plan, and waged a war on the ocean and the Great Lakes.
9. What European nation had the strongest foothold in North America at the opening of the French and Indian War?
 - a. Holland.
 - b. England.
 - c. Spain.
 - d. France.
10. Why did the colonizing efforts of Spain, France and Holland fail?
 - a. They could not get enough people to emigrate to the New World.
 - b. They could not make friends with the Indians.
 - c. They did not have financial backing from Europe.
 - d. They spent their time searching for wealth instead of making homes.

UNIT THREE

How America Became an Independent Nation

Exploration Questions

1. Why were the early American colonists independent?
2. What beginnings did the English colonists make toward political democracy?
3. What was the first constitutional document in the history of America? What was the content of this document?
4. What was the first law-making body in America? How did the representatives receive membership in this assembly? What kinds of laws were passed at its early sessions?
5. What was the make-up of the government in the American colonies?
6. What was the first written constitution in all history made by the people and in the interests of the people? What towns were represented under this constitution?
7. What was the difference between royal, corporation, and proprietary colonies?
8. What did the Navigation Acts purport to do? How did the colonists resist these laws?
9. How did the colonists resist the Stamp Act?
10. What was the success of the Stamp Act?
11. What was the attitude of the English workmen toward the Stamp Act? Why?
12. What was the declaration of the Stamp Act Congress?
13. In what way was the Stamp Act quarrel important?
14. What was the Townshend Act of 1767? How did Massachusetts answer this act? What was England's final decision?
15. What did the Boston Massacre show?
16. What were the Intolerable Acts? Why were they passed?
17. What effect did the Boston Port Bill have on the colonies?
18. Why did England adopt the new plan?
19. Why did General Gage desire to go to Concord with an attachment of troops?
20. What happened to the British troops after they left Concord?
21. What was the significance of the Battle of Bunker Hill?
22. Who wrote the document "Common Sense"? What was its effect?
23. What happened to many of the colonial governors during 1776?
24. What did the Declaration of Independence contain?
25. What are the leading doctrines of the Declaration?
26. What were the disadvantages of the English in the Revolutionary War?
27. What difficulties faced the Americans during the Revolutionary War?
28. What were the important campaigns of the Revolutionary War?
29. What were the terms of the Treaty of Paris which ended the war?

Analysis of the Unit

LEARNING OBJECTIVE

Colonial independence asserted itself when Great Britain attempted to reorganize the old empire, and the American colonists fought the mother country to gain complete freedom.

ELEMENTS OF UNDERSTANDING

1. The colonies, at a very early date, developed a spirit of independence.
2. The character of the colonial governments in 1760, and the relationship of those governments to the English government, had a great deal to do with the American Revolution.
3. Great Britain saw the need of reorganizing the old empire and took definite steps with this end in view.

4. In four distinct ways, the colonists resisted these attempts of Great Britain.
5. The struggle for independence, a civil war, ended victoriously for the Americans.

Assimilative Material

1. Growth of colonial independence: Effect of the ocean and the frontier; development of self-government—House of Burgesses, Mayflower Compact, Connecticut.
2. The colonies in the old British Empire: Character of colonial governments in 1760; relations with the British government—King, Parliament.
3. Attempt of Great Britain to reorganize the old empire: The apparent need of reorganization—effect of the Old French and Indian War; the new Imperial plan—Navigation Acts (Writs of Assistance), taxation (Stamp Act), troops in America (Quartering Acts).
4. Resistance against the new imperial plan: Protests—James Otis and a test case, Stamp Act Congress; violation of law—New York legislature, Boston Tea Party; revolt—Lexington and Concord, Bunker Hill; separation—Declaration of Independence.
5. The struggle for independence—a civil war: In the middle states—Burgoyne's campaign, Washington at Trenton, Howe's campaign; in the west—Clark's campaign; in the south—Cornwallis at Yorktown.

Study Activities

[Numbers refer to pages in *THE WORLD BOOK Encyclopedia*.]

1. Read the following accounts, and be prepared to discuss the material in class.
 - a. The House of Burgesses, 3616.
 - b. The Mayflower Compact, 5665-5666.
 - c. The Connecticut Charter, 1618.
2. State in a discussion of approximately one page the conclusions you are justified in drawing from your study of the above three references.
3. What is the purpose in including "The Growth of Colonial Independence" as a phase of the story of how America became an independent nation? Be able to answer orally.
4. After you have finished the above three exercises, read the account of Bacon's Rebellion, on page 566, and the account of Sir Edmund Andros, on page 279. Be prepared to tell the class what bearing this material has on the subject of study.
5. Write a discussion of three paragraphs explaining the difference between the royal, proprietary, and charter colonies. Devote one paragraph to each of the types of colonies. The three references below describe the three types. Find other references in *THE WORLD BOOK* describing them.
 - a. Virginia—royal, 7542.
 - b. Pennsylvania—proprietary, 5470-5471.
 - c. Connecticut—charter, 1618.
6. How is this second division of the unit, "The Colonies in the Old British Empire," related to the first division, "The Growth of Colonial Independence"? Do you think that the existence of three kinds of colonies hastened the Revolutionary War? Be prepared to answer orally in class.
7. Read the following references, and write an account of the third phase of this unit. Include in your paper only material which shows how Great Britain attempted to reorganize the old empire; include nothing about the resistance of the colonies to the plan.
 - a. Causes of the War, 6071-6074.
 - b. Navigation Acts, 4841-4842.
 - c. Writs of Assistance, 7901.
 - d. Stamp Act, 6796-6797.
 - e. Intolerable Acts, 3492.
8. Read page 1028, and indicate in a short theme the position of Edmund Burke regarding the American colonies.
9. Make a list of all of the unpopular measures passed by the English Parliament.
10. Imagine yourself a resident of New York at the time of the quartering acts. Write a letter to a friend in Virginia expressing your political views.
11. Write a one-page organization of a speech against the Stamp Act which might have been given by an American patriot during the period of the American Revolution.
12. Be prepared to give a short floor talk in class entitled "George the Third and American Affairs."
13. Read the following references, and write an account of the fourth phase of this unit. Be careful to note in the first reference (6071-6074) that part of this material explains the preceding division of our unit, and does not belong in this discussion.
 - a. Causes of the War, 6071-6074.
 - b. Samuel Adams, 35.
 - c. James Otis, 5271.
 - d. Stamp Act Congress, 6796-6797.
 - e. Boston Tea Party, 879-880.
 - f. Paul Revere, 6069.
 - g. Thomas Paine, 5297-5298.
 - h. Patrick Henry, 3147-3149.
 - i. Minutemen, 4526.

- j. John Hancock, 3031-3032.
- k. Richard Henry Lee, 3917.
- l. Henry Laurens, 3893.
- m. Declaration of Independence, 1865-1868.
- n. Boston Massacre, 879.
14. Be able to name all of the means used by the colonists to oppose the unpopular measures passed by Parliament.
15. Prepare a list of Revolutionary patriots conspicuous for their service. Indicate the service in each case, and show how it helped to win the American cause.
16. Using the material found on pages 6071-6074, make a tabular chart including in one column the topics which belong in the third division of this unit, and in the other column the material which belongs in the fourth division.
17. Draw a cartoon, a picture, a diagram, or a graph which will portray some phase of the third and fourth divisions of the unit.
18. The following accounts contain illustrative material. Take notes on these accounts and be prepared to discuss them in class:
 - a. William Pitt, 5632.
 - b. Mecklenburg Declaration of Independence, 4370-4371.
 - c. Sons of Liberty, 6688.
 - d. History of Ontario, 5210.
19. Read the account of "The Eight Years of the War," on pages 6074-6082, and make a summary of the material included in this discussion.
20. The following accounts illuminate the subject of study. Read them, and prepare for a class discussion based upon this material.
 - a. Benjamin Franklin, 2596-2597
 - b. Horatio Gates, 2704.
 - c. Nathan Hale, 3016.
 - d. Hessians, 3170.
 - e. Thomas Hutchinson, 3300.
 - f. John Paul Jones, 3695-3696.
 - g. Robert Morris, 4662.
 - h. Treaty of 1783, 5380.
 - i. Israel Putnam, 5888-5890.
 - j. Ethan Allen, 224.
 - k. United Empire Loyalists, 7361.
 - l. Marquis de Lafayette, 3838.
 - m. General Gage, 2658.
 - n. General John Burgoyne, 1026-1027.
 - o. Valley Forge, 7445.
 - p. Charles, Marquis Cornwallis, 1694.
 - q. George Washington in the Revolution, 7650-7651.
21. Continue the list of patriots already started. Indicate the service each rendered.
22. Be able to explain the part taken by the Tories in the Revolutionary War.
23. Write an imaginary account of your experiences with Washington at Valley Forge.
24. Be able to explain why you think the Americans won the war.
25. Be prepared to indicate in class why the following statements are called biased views:
 - a. Great Britain had no reason to reorganize the old empire.
 - b. The Navigation Acts were more reasonable than the revenue acts.
 - c. The American colonists won the Revolutionary War because of their superior strength.
26. Be prepared to indicate in class why the following statements are called fundamental misconceptions:
 - a. The king of England was supported unanimously by the people of England in 1776.
 - b. The greater portion of American colonists desired to fight England to gain complete freedom.
 - c. The colonists were afraid to protest until after the Revolutionary War had begun.
27. Some of the statements included below do not belong in the division in which they appear. Put a cross (x) in front of each statement which is misplaced. Reorganize the material so that each statement will appear in the proper division:
 1. Growth of colonial independence.
 - a. Many American colonies were royal.
 - b. The House of Burgesses was in Virginia.
 - c. Self-government developed in the colonies.
 - d. The Stamp Act Congress was important.
 2. The colonies in the old empire.
 - a. Pennsylvania was a proprietary colony.
 - b. The Pilgrims signed the Mayflower Compact.
 - c. Some powers were colonial, and some were central.
 - d. James Otis resisted England.
 3. Attempt of Great Britain to reorganize the old empire.
 - a. The colonists threw tea into the ocean.
 - b. The House of Burgesses met in Virginia.
 - c. England passed the Navigation Acts.
 - d. England passed the Stamp Act.
 4. Resistance against the new plan.
 - a. New York refused to obey the Quartering Acts.
 - b. The colonists signed the Declaration of Independence.
 - c. England passed the Navigation Acts.
 - d. Clark's campaign was in the West.
 5. The struggle for independence.
 - a. The struggle was really a civil war.
 - b. Cornwallis surrendered at Yorktown.
 - c. Burgoyne's campaign was in the middle states.
 - d. Colonists were defeated at Lexington.
28. Some pupils may desire to prepare note-

books based upon one or more of the units already studied, or upon later units. The contents of the notebooks may be as follows:

- a. A collection of pictures, articles, stories, and newspaper clippings; and personal comments for each.
- b. A series of quotations or statements taken from reference books; and personal comments for each.

Each of the above two divisions should constitute a chapter in the notebook. Great care should be given to the selection of materials. It should not be the purpose to prepare a large quantity of material. A small number of pictures, articles, stories, clippings, quotations, and statements carefully selected is far more valuable than a larger number carelessly chosen, *and which have little merit.*

You should give more time and thought to your reactions than to the mere collection of material. There are numerous things that you read and see which *do* at once challenge your thinking. That is the type of material which should be included.

The directions and suggestions given below should be carefully studied and followed, unless you can suggest a better plan:

- a. Each picture, article, or clipping should be given at least one page.
- b. All material which is placed in the notebook should have the source and date of publication. Unless the material can be better arranged, it should be placed at the top of the page and to the right. The title, source, place, and date of publication should be given at the top of the page and to the left, opposite the material. This will leave the bottom of the page for your own opinion, comments, or reaction.
- c. The same form should be observed in respect to the quotations or statements, with the exception that one page will not have to be devoted to each statement and its evaluation. Be careful to quote exactly the material as it is found in the original.

A Test in Understanding

Place a cross (x) before each correct answer to a question, and a question mark (?) before each answer which is debatable. Do not mark incorrect answers in any way. Be prepared to justify your selections:

1. Why did a spirit of independence develop during the colonial period?
 - a. Because the colonists were far removed from England and those highest in authority.
 - b. Because the colonists were closely as-

sociated with England and those highest in authority.

- c. Because the colonists had been conservative and careful in the Old World.
 - d. Because the colonists lived in frontier communities.
2. How did the Pilgrims show their desire for self-government?
 - a. They established a common fund, and required each person to pay in a portion of his earnings.
 - b. They drew up a compact in which they agreed to stand together and obey the laws.
 - c. They kept in contact with the social and religious life of England.
 - d. They planned a convention and invited the other colonists to join in a discussion of problems.
 3. How were the British and the colonists alike?
 - a. They both had common citizenship and the English common law.
 - b. They both had similar ideas of government.
 - c. They both had the same ideas concerning industry.
 - d. They both had the same social interests.
 4. How did the people of Connecticut show their desire for self-government?
 - a. They adopted the first written constitution in America.
 - b. They were the first to defeat the Indians decisively.
 - c. They established the first common warehouse in America.
 - d. They defeated the spirit of independence by popular vote.
 5. What was the underlying cause of the conflict between England and America?
 - a. England tried to force the colonies from the territory west of the Alleghanies.
 - b. England encouraged the governors to quarrel with the colonial assemblies.
 - c. England demanded that the colonies and France cease all friendly relations.
 - d. English leaders tried to enrich the mother country by limiting the economic development of the colonies.
 6. What part did France play in the American Revolution?
 - a. France gave help to England because the rebellious spirit of the Americans was spreading to French provinces.
 - b. France remained neutral; the French government could not take sides without causing a revolution in the French provinces.
 - c. France gave help to the Americans; money and military supplies were followed by an army and a fleet.
 - d. France was divided; consequently, both

England and the colonies benefited by French aid.

7. What famous quotation expresses the argument used by the colonists in answer to the Writs of Assistance?
 - a. "The child is father of the man."
 - b. "God made the country and man made the town."
 - c. "A man's house is his castle."
 - d. "Nothing great was ever conceived without enthusiasm."
8. Why were the British regulars sent to Lexington and Concord?
 - a. To provide training for the troops who had been in Boston so long.
 - b. To arrest Hancock and Adams and destroy military supplies that were stored at Concord.
 - c. To capture George Washington and Paul Revere.
 - d. To show the colonists the strength of the English.
9. What does the Declaration of Independence contain?

- a. It contains a statement of what the colonies intended to do after they left the mother country, and a request to France to give military and financial aid.
- b. It contains a long list of things which the English had done that caused the colonists to decide finally to leave the mother country.
- c. It contains a long and carefully worded statement of what the colonies intended to do after they had separated from the mother country.
- d. It contains reasons why the colonies wanted to be independent, a statement of the rights of governments and of citizens, and the actual declaration of the colonists.
10. What was the turning point of the Revolutionary War?
 - a. The victory at Trenton.
 - b. Burgoyne's failure.
 - c. The capture of Philadelphia.
 - d. The capture of Vincennes.

UNIT FOUR

How We Secured Our National Government

Exploration Questions

1. What colonies were members of the New England Confederation? What value did the colonies see in such a confederation?
2. How did the New England Confederation prove most effective?
3. How long was the New England Confederation in existence?
4. What was the purpose of the Committees of Correspondence?
5. Why did England object to the Committees of Correspondence?
6. What were the contents of the Declaration of Rights, drawn up by the First Continental Congress?
7. What duties did the Second Continental Congress perform that each colony could not have performed for itself?
8. In what respects were the Articles of Confederation weak?
9. Why did the states delay in ratifying the Articles of Confederation?
10. What was the attitude of the people assembled at the Annapolis Convention? How many states were represented at this convention?
11. Who were the chief members of the Constitutional Convention?
12. Why was there friction in the Constitutional Convention?
13. In what ways were the provisions of the Constitution the result of compromises?

14. Who is often called the "Father of the Constitution"?
15. Why was there so much opposition to the ratification of the Constitution?
16. What chief difference do you see between the Constitution and the Articles of Confederation?
17. Why was the Bill of Rights adopted?
18. What part of the Constitution gives Congress almost unlimited power?
19. What serious problem faced the new nation?
20. What was necessary to put the new government in running order?
21. Who made the necessary arrangements for ushering in the new government?
22. Where was Washington inaugurated President of the United States?
23. How was the new Congress organized?
24. How were the Executive departments under Washington formed?
25. How did the members of Washington's Cabinet receive their offices?
26. Who were the members of Washington's first Cabinet?
27. What does the Constitution say about the court system?
28. How were the members of Washington's first Cabinet qualified for their work?

Analysis of the Unit

LEARNING OBJECTIVE

Our national government is an outgrowth of experience in colonial and Revolutionary

times, deriving its present form from a Constitution drawn up by a convention of delegates from the various states and adopted by the American people.

ELEMENTS OF UNDERSTANDING

1. The value of united action was seen by the colonists in early unions formed for mutual safety and welfare.
2. The troubles of the Americans under the Articles of Confederation showed them the need for a stronger union.
3. Following preliminary conferences, delegates met in Philadelphia and framed the Constitution of the United States which, after a long struggle, was ratified by the states.
4. The national government was established when officers of the Executive, Legislative, and Judicial departments provided for by the Constitution assumed their duties.

Assimilative Material

1. Early attempts at union: New England Confederation; the Albany Plan; Committees of Correspondence; Continental Congress.
2. Articles of Confederation: Drafting; defects; difficulties experienced—revenue, commerce, amendments, order.
3. The making of the Constitution: Annapolis Convention; Constitutional Convention—its purpose, chief members, struggle and compromise, character of Constitution, its ratification.
4. The establishment of the national government: Election of Congress and the President; organization of Congress; inauguration of Washington; organization of the Executive departments; the establishment of courts.

Study Activities

[Numbers refer to pages in THE WORLD BOOK Encyclopedia.]

1. The following tabulation is for the purpose of keeping a record of the desirable and undesirable content factors of written expression and errors in English, diction, and composition identified in your written work by the teacher during the study of Unit Four. You will be expected to keep a record of your own work. Place a figure in each column to indicate the number of times you have conformed to desirable content standards, or have experienced difficulty with content or English. In the column marked "Number of Reteachings," place a number showing the number of times you have

required assistance in correcting your work.

Content (desirable)	Exercise 2	Exercise 3	Exercise 4	Exercise 5	Exercise 7	Exercise 8	Exercise 10	Exercise 11	Exercise 13	Total No.
Interpretation of contents										
References to previous units										
Modern parallels										
Content (undesirable)										
Irrelevant details										
Significant facts omitted										
Misplaced topics										
Incorrect statements										
Limited sources										
Biased views										
English, Diction, and Composition										
Sentence structure										
Punctuation										
Spelling										
Grammar										
Neatness and form										
Number of Reteachings										

2. Read the following accounts, and prepare a sentence outline of the material. You should have five major divisions in the outline.
 - a. New England Confederation, 4913.
 - b. Albany Convention, 182.
 - c. Committees of Correspondence, 1585.
 - d. Continental Congress, 1644-1645.
 - e. Articles of Confederation, 432-433.
3. Imagine yourself a person living in Boston at the time of the New England Confederation, and write a letter to a friend in New Haven telling of the disadvantages of the Confederation.
4. In order to test your ability to use reference material, find accounts in THE WORLD BOOK of the early intercolonial wars, and write a short paper showing how these wars were valuable in teaching the Americans to act together.
5. Prepare two briefs, one for each side, of a

debate on the following question: Resolved, that the Committees of Correspondence represented a stronger union than did the First Continental Congress.

6. How did the work of the Second Continental Congress show the value of a strong union? This problem will be discussed in class.
7. Explain in a short paragraph the significance of the Articles of Confederation. Why was the government organized?
8. Indicate in outline or story form three defects of the Articles of Confederation which made necessary the formation of a stronger union.
9. What is the significance of the discussion of the Annapolis Convention on page 292? Be prepared to explain how this story fits into the unit, "How We Secured Our National Government."
10. Write a three-page theme showing how the Constitution was made and adopted. Explain the attitude of the states that opposed the adoption of the Constitution. 1631-1634.
11. How was the national government established? Answer in a theme of not more than three pages. 7651-7653, 5801-5808, 1607-1608, 1722.
12. The following accounts may be read after the above exercises are completed. These accounts are supplementary; although they do not bear directly upon the subject of study, they relate to this unit, and may be read by pupils who complete the regular assigned work before the other members of the class.
 - a. United States Supreme Court, 6940-6942.
 - b. The Cabinet of the United States, 1058-1059.
 - c. Secretary of State, 6814-6815.
 - d. Speaker of the House of Representatives, 6746.
 - e. United States Senate, 6488-6491.
 - f. House of Representatives, 6060-6062.
 - g. Joseph G. Cannon, 1173-1174.
 - h. John Marshall, 4304-4305.
 - i. War Department, 7600.
 - j. White House, 7747-7750.
 - k. Constitution of the United States, 1632-1643.
 - l. Bill of Rights, 739-740.
13. Make a list of all the subject matter which might be included in both the third and the fourth units. Indicate in the case of each item why you think the material is best suited to the unit in which it is included. If you think that an item could be used to better advantage in the unit in which it does not appear, defend your position.
14. Some of the statements below do not be-

long in the division in which they appear. Put a cross before each statement that is misplaced, and an arabic numeral (1, 2, 3, 4, or 5) after the statement indicating the division in which it should appear.

1. The New England Confederation.
 - a. Four colonies were represented.
 - b. An Indian uprising was crushed.
 - c. A Continental Army was provided.
 - d. The Articles of Confederation were provided.
2. The Committees of Correspondence.
 - a. George Washington was given command of the armies.
 - b. Affairs of Parliament were investigated.
 - c. Massachusetts opposed the continuation.
 - d. England objected because the work was secret and intangible.
3. The Second Continental Congress.
 - a. Massachusetts had to pay too much money.
 - b. Massachusetts had to furnish too many men.
 - c. The union provided for a central government during the Revolution.
 - d. An Indian uprising was crushed.
4. The Articles of Confederation.
 - a. Chief work was advising and amending.
 - b. James Madison and John Marshall gave active support.
 - c. Small and large states could not agree.
 - d. Annapolis Convention was held a year before the meeting.
5. The Constitutional Convention.
 - a. The articles of Confederation were provided.
 - b. Laws could not be enforced.
 - c. People realized that the government was tottering.
 - d. The union lasted forty years.

A Test in Understanding

Place a cross (x) before each correct answer to a question, and a question mark (?) before each answer which is debatable. Do not mark incorrect answers in any way. Be prepared to justify your selections:

1. What was the purpose of the New England Confederation?
 - a. Its purpose was for better protection against the Indians, the Dutch, and French.
 - b. Its purpose was to create an attitude of sympathy throughout the colonies for the English government.
 - c. Its purpose was to create an attitude of hatred throughout the colonies for the English government.

- d. Its purpose was to propose ways and means of organizing a national congress.
2. What was the purpose of the colonial Committees of Correspondence?
 - a. To make possible a colonial organization to correspond with England regarding questions of taxation.
 - b. To obtain knowledge of the acts of Parliament, and to keep the colonies in touch with each other.
 - c. To raise money for the payment of foreign debts, and to provide for its distribution.
 - d. To raise money for the support of the state legislatures and to provide for its distribution.
3. What was the purpose of the First Continental Congress?
 - a. To unite the opposition against the activities of the Tories in the colonies.
 - b. To organize a government that could make and enforce laws and ordinances.
 - c. To unite the opposition against the oppressive laws passed by the British Parliament.
 - d. To end at once all trouble with the Indians, and to pay the colonists money which was due them.
4. In what respect was the government under the Articles of Confederation weak?
 - a. The state governments had to depend on the national government.
 - b. The court system which was provided for did not give the judges sufficient pay.
 - c. The national government had no power or means to enforce its acts.
 - d. The court system which was provided for was given too much power.
5. Why was not the Annapolis Convention a success?
 - a. The members who were present were too hostile and bitter.
- b. The place of meeting was not a central location.
- c. The English delegates were too severe in their demands.
- d. Only five states were represented.
6. Why was the Constitutional Convention held?
 - a. People agreed that the Confederacy was tottering.
 - b. The people agreed that the national treasury was too strong.
 - c. The states needed financial aid in order to pay local officers.
 - d. England warned the colonies that a better government was necessary.
7. What percentage of the electors in 1789 voted for Washington?
 - a. About fifty per cent.
 - b. About seventy-five per cent.
 - c. About ninety per cent.
 - d. One hundred per cent.
8. What was necessary to put the new government in running order?
 - a. New offices had to be established and the duties pertaining to them declared.
 - b. The court system had to be entirely reorganized.
 - c. The men who had served in the army had to be given work.
 - d. The Continental Army had to be quartered and kept in training.
9. What does the Federal Constitution say about the judicial power of the United States?
 - a. A certain number of courts shall be provided by Congress.
 - b. There shall be one Supreme Court and others which Congress from time to time may establish.
 - c. The judicial power shall be under the control of the Executive department.
 - d. The judicial power of the United States is not mentioned in the Constitution.

UNIT FIVE

How Our National Government Was Tested

Exploration Questions

1. What financial problems confronted the new nation during Washington's administrations?
2. What did Hamilton mean by "funding the nation's debts"?
3. What did Hamilton propose to do about the debts that the states had contracted in carrying on the Revolutionary War?
4. How were the new national obligations to be paid?
5. What was the position of Alexander Hamilton concerning a National Bank?
6. What was the attitude of Congress in reference to the payment of the foreign debt? The domestic debt?
7. What was Hamilton's reasoning in reference to the payment of the foreign debt and the domestic debt?
8. Why did many people disagree with Hamilton's proposal in reference to the payment of the domestic debt?
9. What is meant by a tariff? What kind

of a tariff was passed by the first American Congress?

10. What kind of an internal-revenue tax did Hamilton propose?
11. Why was the tariff on goods manufactured in other countries easier to collect than internal-revenue taxes?
12. Why did the national government experience difficulty collecting the internal-revenue tax?
13. How were the revenue collectors received by the farmers of Pennsylvania?
14. What action did Washington take to end the Whisky Insurrection?
15. What was the significance of the Whisky Rebellion?
16. Why were England and France opposed to each other in 1792?
17. What request did France make of the United States that put the latter in a difficult position? Why was that position a difficult one?
18. What policy was stated by Washington in reference to American affairs?
19. What was the attitude of the French minister to the United States? What did he do?
20. What was the attitude of France toward America after Washington's proclamation?
21. How did Federalists and Anti-Federalists differ regarding the assumption of debts?
22. How were the two political parties reconciled on the question of the assumption of debts?
23. Why was the tariff unpopular with a certain element of the American population?
24. Why did the Anti-Federalists oppose the organization of a United States Bank?
25. What did Federalists and Republicans think of the ability of the common people?
26. What was the attitude of Federalists and Republicans toward the French government?
27. What were the Alien and Sedition Laws? Why were these laws passed?
28. What was done by Virginia and Kentucky after the passage of these two acts? Why did not the other states follow the example of Virginia and Kentucky?
29. Who came to the Presidency in 1800? Of what significance was this change?
30. What followed President Adams' announcement that no more representatives would be sent to France until he could be sure they would be properly received?
31. What was the nature of the quasi-war with France?
32. Who were the Barbary pirates? How did the Barbary pirates affect the United States?
33. What is a "paper blockade"? Why did

the United States object to such a blockade?

34. What was England's main chance to crush France?
35. What is meant by the expression, "Free ships make free goods"?
36. Why did England impress American sailors?
37. What was the Chesapeake affair?
38. How did the United States retaliate against England and France?
39. What were the principal reasons we chose to fight England instead of France?
40. What definite indication do we have that the United States was divided, that New England and New York did not want war?
41. What were the chief military events of the War of 1812?
42. What was the significance of the War of 1812?
43. In what way was the War of 1812 a severe test for the newly-organized national government?

Analysis of the Unit

LEARNING OBJECTIVE

During the first twenty-five years of its existence the national government was tested by serious difficulties which it successfully overcame.

ELEMENTS OF UNDERSTANDING

1. The new government solved difficult financial problems.
2. The new government enforced its laws in spite of armed opposition.
3. The new government maintained its neutrality during a world war regardless of determined efforts to bring it into the struggle as the ally of one of the combatants.
4. The new government survived the conflicts of rival political parties.
5. The new government stood the strain of a foreign war in spite of internal opposition.

Assimilative Material

1. Finance: Financial problems of the new government—debt, current expenses, income; Hamilton's proposals—foreign debt, domestic debt, tariff.
2. Law and order: Collection of Federal taxes—tariff, whisky; attitude of the West on whisky tax; Whisky Rebellion—causes, chief incidents, action of national government, significance.
3. Neutrality: European war; proclamation of neutrality; Citizen Genêt; X Y Z affair; avoidance of war with France.
4. Political parties: Views of the people—

finance, interpretation of the Constitution, European affairs; Federalists in power—Alien and Sedition Laws; Virginia and Kentucky Resolutions; election of 1800.

5. War: Quasi-war with France; the Barbary pirates; war with England (1812)—causes, military events (invasion of Canada, Perry on Lake Erie, the Constitution and the Guerriere, blockade on the Atlantic coast, burning of Washington, Battle of New Orleans); internal opposition—Hartford Convention; results of the war.

Study Activities

[Numbers refer to pages in THE WORLD BOOK Encyclopedia.]

1. Indicate in a discussion of at least two pages how the new government solved difficult financial problems.
 - a. Alexander Hamilton, 3025-3026.
 - b. National Debt, 4814.
 - c. Internal Revenue, 3482-3483.
 - d. George Washington, 7653.
 - e. Bank of the United States, 602.
2. How was the Whisky Rebellion a test of the new government? Be prepared to discuss this question in class. 7742, 2666, 7654.
3. The following references should indicate how the new government maintained its neutrality during a world war regardless of determined efforts to bring it into the struggle as the ally of one of the combatants. Explain in a brief discussion how the government maintained its neutrality.
 - a. Washington's Second Term, 7654.
 - b. Edmund Genêt, 2715.
 - c. X Y Z Correspondence, 7917.
 - d. Administration of Thomas Jefferson, 3650-3651.
 - e. Administration of James Madison, 4202.
 - f. Non-Intercourse Act, 5040.
 - g. Embargo Act, 2219.
4. Do you think that Washington acted wisely in issuing a proclamation stating that America would remain neutral? Indicate in a short paragraph how Washington might have reasoned in arriving at the conclusion that the new nation should stay out of entangling European alliances.
5. What part did Jefferson and Madison play in attempting to carry out the Neutrality Proclamation? Be prepared to discuss in class.
6. The following references show that the new government survived the conflicts of rival political parties. Prepare a sentence outline of this division of the unit, and be prepared to discuss in class the part of the outline which you think most significant in showing the activities of the two major parties. The references for exercise 3 should be reviewed before the outline is made.
 - a. History of Political Parties in the United States, 5705.
 - b. Democratic Party, 1888-1889.
 - c. Aaron Burr, 1037.
 - d. Alien and Sedition Laws, 221.
 - e. Anti-Federalist Party, 310.
 - f. Federalist Party, 2390.
 - g. Jefferson, Secretary of State and Vice-President, 3648.
 - h. Election of 1800, 3648-3650.
 - i. Alexander Hamilton, 3026.
 - j. Virginia and Kentucky Resolutions, 3765.
 - k. Death of the Federalist Party, 4202.
7. Be prepared to explain before the class exactly how the election of 1800 was a test of the new government.
8. Do you think that the Virginia and Kentucky Resolutions were as severe a test for the new government as the Whisky Rebellion? Formulate some basis for a comparison of these two tests, and be prepared to indicate your point of view in class.
9. Read the account of "The War of 1812," on pages 7601-7606, and prepare a topical outline of this material. Using your outline as a guide, write a comprehensive story of this phase of the unit, indicating how the war tested the new government.
10. What importance do you attach to the Hartford Convention, which is discussed on page 3065? Answer in a short paragraph.
11. The following references contain materials which explain how the government was tested by war.

Read each account and be prepared to discuss the major points in class:

 - a. James Madison, 4202.
 - b. Oliver H. Perry, 5492-5493.
 - c. Star-Spangled Banner, 6812-6813.
 - d. Treaty of Ghent, 2797.
 - e. James Lawrence, 3900-3901.
 - f. Battle of Lake Erie, 2286-2287.
 - g. Stephen Decatur, 1856.
 - h. James Barron, 630.
 - i. Barbary States, 617-618.
 - j. Black Hawk, 781.
 - k. The Constitution, 1630-1631.
12. Indicate in a composition of at least three pages which of the five tests that the new government overcame was the most severe. Give reasons for your opinions, and include as much history in your paper as you can to support your point of view.

13. Prepare a list of the historical items, events, and personages about which you read during your study of the first four units which are essential to an understanding of the unit "How Our National Government Was Tested."
14. Indicate in a short theme the close relationship between the first and second elements of this fifth unit.

A Test in Understanding

Place a cross (x) before each correct answer to a question, and a question mark (?) before each answer which is debatable. Do not mark incorrect answers in any way. Be prepared to justify your selections:

1. What was the most pressing difficulty which the new government faced during Washington's administration?
 - a. How to limit the powers of the Federal officers.
 - b. How to enlarge the army and navy.
 - c. How to pay its debts.
 - d. How to punish its enemies.
2. What Federal taxes severely tested the national government during Washington's administration?
 - a. Tariffs on imported goods.
 - b. Income taxes.
 - c. Taxes on goods that were produced in America.
 - d. Amusement taxes on certain entertainments.
3. What was the outstanding result of the Whisky Rebellion?
 - a. The national government showed that it could enforce its laws.
 - b. The national government was shown to be unable to enforce its laws.
 - c. Western and Southern landowners became united.
 - d. Jefferson and Hamilton were led to view things in the same way.
4. What caused Citizen Genêt to defy the American government?
 - a. The refusal of the American government to aid England.
 - b. The refusal of the American people to receive him cordially.
 - c. The hatred shown by the officers at Charleston when he landed.
 - d. The refusal of the American government to aid France.
5. What was the attitude of France and England toward the United States during the years 1798-1812?
 - a. Each tried to draw the United States into the war in Europe as its ally.
 - b. Each tried to get the United States to remain neutral.
 - c. Each tried to crush the power of the United States.

- d. Each tried to develop and improve the United States.
6. What was Washington's attitude toward Europe when he was President?
 - a. He favored permanent alliance with the English.
 - b. He advised making treaties with all European countries.
 - c. He declared America neutral.
 - d. He did not express himself on the question of European affairs.
7. What causes contributed to the downfall of the Federalist party?
 - a. The attempt to support the French government.
 - b. The support of the Alien and Sedition Laws.
 - c. The support which they gave to the low tariff.
 - d. The attempt to cause trouble between Virginia and Kentucky.
8. Why were the Virginia and Kentucky Resolutions passed?
 - a. To defeat the purpose of the Hartford Convention.
 - b. To organize a strong militia for the two states.
 - c. To oppose the Alien and Sedition Laws.
 - d. To oppose the formation of the National Bank.
9. Why were the Alien and Sedition Laws opposed?
 - a. They gave too much power to the individual states.
 - b. They were unfair to the Western farmers.
 - c. They were disagreeable to the English government.
 - d. They interfered with freedom of speech and the press.
10. How did the War of 1812 test the national government?
 - a. The War of 1812 showed that two parties were undesirable.
 - b. The War of 1812 did not test the government.
 - c. The military forces were given an excellent opportunity to show their strength.
 - d. The machinery of the new government was put to a severe test.
11. What was the effect of the War of 1812 upon America?
 - a. The War of 1812 did much to nationalize the country.
 - b. It did much to strengthen the state governments.
 - c. It caused New England to withdraw from the Union.
 - d. It was of slight consequence, and in no way changed America.

UNIT SIX

How Negro Slavery Was Destroyed

Exploration Questions

1. When were negroes first brought to the colonies? Where were they landed?
2. Why did slavery decline in the South before the invention of the cotton gin?
3. What did Pennsylvania, New Jersey, and other states farther north do about slavery after the Revolution?
4. What is the significance of the date 1808?
5. What is the significance of the slave-trade compromise in the story of this unit?
6. Why did the Southerners say that they couldn't free the slaves?
7. What does the Constitution say about slaves or slavery?
8. How did the invention of the cotton gin affect the institution of slavery?
9. What was the position of slavery in Maryland, Virginia, and North Carolina between the years 1783 and 1860?
10. How many of the original thirteen states abolished slavery after the Revolution?
11. Why did the North object to the admission of Missouri into the Union as a slave state?
12. What were the provisions of the Missouri Compromise?
13. What was the Wilmot Proviso?
14. What was the position of Congress regarding the Wilmot Proviso?
15. What is "squatter sovereignty"?
16. What were the provisions of the Compromise of 1850? What was the effect of this Compromise upon the country?
17. Who were Benjamin Lundy and William Lloyd Garrison?
18. What was the "Liberator"?
19. Who were three outstanding statesmen in Congress in 1849?
20. What part did Daniel Webster play in the slavery controversy?
21. What influence did "Uncle Tom's Cabin" have upon the country?
22. What was the "underground railroad"?
23. How did the Kansas-Nebraska Bill conflict with the Missouri Compromise?
24. What part did John Brown play in the slavery controversy?
25. What was the significance of the Dred Scott Decision?
26. How did Stephen A. Douglas offend the North?
27. What chief arguments did Lincoln and Douglas present in their famous debates?
28. What position was Douglas forced to take in the debates with Lincoln that offended the South?
29. What is the story of the organization of the Confederate States of America?
30. What criticism may justifiably be made of President James Buchanan's policy during the slavery controversy?
31. What did Andrew Jackson do during his administration that President Buchanan might have attempted?
32. What was Lincoln's attitude regarding secession when he became President?
33. How did the South justify the act of firing upon Fort Sumter?
34. Why was it impossible for the North to yield Fort Sumter?
35. Why did many white people in the South who did not hold slaves fight in support of the slaveholders?
36. What twelve significant military events and movements explain the general plan of the War of Secession?
37. What did the Emancipation Proclamation propose to the South?
38. What was the great value of the Emancipation Proclamation to the North?
39. How did the War of Secession come to an end?
40. How was negro slavery entirely destroyed?

Analysis of the Unit

LEARNING OBJECTIVE

The struggle between the North and the South over the growth of slavery resulted in the secession of Southern states, the War of Secession, and the freeing of all slaves.

ELEMENTS OF UNDERSTANDING

1. Negro slavery, which was introduced into America at an early date, spread through all the colonies, but disappeared in the North during the Revolution, leaving the country half slave and half free.
2. The settlement of the West by people from the North and the South caused a serious conflict over the extension of slavery into the newly-occupied region.
3. The Southern states, believing that President Lincoln would destroy slavery, left the Union and set up a separate government.
4. The secession of the South brought on a civil war which resulted in the preservation of the Union and the destruction of slavery.
5. The Constitution of the United States was amended to give the negro freedom and citizenship.

Assimilative Material

1. Early slavery in America: Slavery in colonial Virginia; spread to the other

- colonies; freedom given negroes in the North; the cotton gin and its effect.
2. Contests over the growth of slavery: Balance of power between the free and the slave states; Missouri Compromise; Compromise of 1850; struggle over Kansas; election of 1860.
 3. The secession movement: Causes which led the states to secede in 1860; story of secession—South Carolina, effect on other states, formation of Confederate States of America, Lincoln, and Fort Sumter.
 4. The War of Secession: Comparison of North and South; the work of the Navy; Bull Run; opening of the Mississippi; the siege of Vicksburg; Lee and the Battle of Gettysburg; Sherman's march to the sea; Grant and the fall of Richmond.
 5. The end of slavery: Divided attitude of Northerners on slavery; use made of slaves after the war started; Emancipation Proclamation; Thirteenth and Fourteenth Amendments.

Study Activities

[Numbers refer to pages in *THE WORLD BOOK Encyclopedia*.]

1. The following references explain the first division of this unit. Read each account carefully, and make an outline of the material. There should be at least four major divisions in the outline.
 - a. Colonial History of Virginia, 7542.
 - b. Eli Whitney and the Cotton Gin, 1718-1719, 7754.
 - c. War of Secession—Early Slavery in America, 7607.
 - d. Negroes in the United States, 4871.
2. Review the Constitution of the United States, and write the number of every article and section that says anything about slaves or slavery. Be prepared to report the results of your study in class. 1635-1643.
3. The following references explain the second phase of the unit. You are expected to do two things in completing this third exercise: First, read the accounts listed below, and take notes on anything which illuminates the *first* division of this unit; second, prepare an outline of the material which deals with the *second* phase of the unit. Your outline should indicate that the settlement of the West by people from the North and the South caused a serious conflict over the extension of slavery into the newly-occupied region.
 - a. Nullification and States' Rights, 5111-5112, 6815-6816, 3100.
 - b. Abolitionists, 9.
 - c. Horace Greeley, 2954-2955.
 - d. William Lloyd Garrison, 2695-2696.
 - e. Wendell Phillips, 5564.
 - f. Josiah Quincy, 5922.
 - g. Republican Party, 6063-6064.
 - h. Stephen A. Douglas, 2015-2016.
 - i. Dred Scott Decision, 2031, 7014.
 - j. Harper's Ferry, 3050-3051.
 - k. Kansas—Territorial Days, 3739-3742.
 - l. Kansas-Nebraska Bill, 3746.
 - m. Liberty Party, 3965-3966.
 - n. Missouri Compromise, 4558-4559, 4605.
 - o. Sovereignty, 6724.
 - p. Squatter Sovereignty, 6787-6788.
 - q. Charles Sumner, 6920.
 - r. Compromise of 1850, 1595, 5199-5200.
 - s. Story of Henry Clay, 1459-1460.
 - t. John C. Calhoun, 1078-1079.
 - u. Daniel Webster, 7696-7697.
 - v. John Brown, 978.
 - w. Ohio Company, 5177.
 - x. Ordinance of 1787, 5242.
 - y. Harriet Beecher Stowe, 6871.
 - z. Lewis Cass, 1220.
 - aa. Fugitive Slave Laws, 2631.
 - bb. The Story of Millard Fillmore, 2415-2418.
 - cc. Wilmot Proviso, 7776-7777.
 - dd. James Buchanan's Administration, 991-992.
 - ee. Crittenden Compromise, 1749.
 - ff. Free-Soil Party, 2603.
 - gg. The Approaching Crisis, 4012-4015.
 - hh. The Administration of Franklin Pierce, 5607-5608.
 - ii. "Underground Railroad," 7350.
 - jj. John Bell, 703-704.
4. Be prepared to explain orally how the Kansas-Nebraska Act conflicted with the Missouri Compromise.
5. Prepare an outline, a debate, a cartoon, or a play which illustrates the part played by Clay, Webster, and Calhoun in the slavery controversy.
6. Discuss in a paper of not more than four pages the attitude of Lincoln toward the slavery controversy. Indicate his point of view from the time he was a small boy until his death. Remember that his attitude changed at different times during his life.
7. Why did many Southerners contend that slavery could not endure with Lincoln President of the United States? This question will be discussed in class.
8. Prepare an outline of the secession movement. The following accounts contain material dealing with the subject of secession:
 - a. Lincoln, Candidate for President; Administration of Lincoln, 4014-4015.
 - b. Slavery and Secession, 3684.
 - c. The White House of the Confederacy, 6118-6120.

- d. Confederate States of America, 1603-1605.
- e. The Story of Jefferson Davis, 1838-1839.
- f. Fort Moultrie, 2544-2545.
- g. Fort Sumter, 2545-2546, 665.
- h. War of Secession, 7607-7609.
- i. History of Virginia, 7542.
9. In a short paragraph, explain what you consider to be the real significance of the election of 1860.
10. Prepare an outline of the War of Secession, including only subject matter which you think essential to an understanding of the conflict. The following accounts contain material, *some* of which you will want to use in your outline. This is an exercise in selection and discrimination, and does not call for the inclusion of every item given in these references.
 - a. War of Secession, 7609-7621.
 - b. The Story of Grant, 2899-2902.
 - c. Joseph Hooker, 3223.
 - d. Blockade, 794-795.
 - e. Albert Johnston; Joseph Johnston, 3690-3691.
 - f. Story of Robert E. Lee, 3917-3921.
 - g. Navy of the United States, 4846, 4851.
 - h. Lincoln's Administration, 4016-4018.
 - i. Braxton Bragg, 916.
 - j. The Alabama; Alabama Claims, 164.
 - k. Henry Ward Beecher, 683.
 - l. History of Atlanta, 488.
 - m. Charles Francis Adams, 24.
 - n. Stonewall (Thomas J.) Jackson, 3605-3606.
 - o. The Trent Affair, 7262.
 - p. David G. Farragut, 2373.
 - q. Gettysburg Address, 2793-2794.
 - r. Rutherford B. Hayes, 3094-3095.
11. Be prepared to explain orally why the North won the War of Secession. At least five reasons should be included in an adequate discussion of this question.
12. After reading the following references, write a discussion entitled "The End of Slavery." Indicate in your paper why this division of thought is the logical conclusion to the unit.
 - a. Emancipation Proclamation, 7610, 4016.
 - b. Amendments to the Constitution, 246, 1634, 1642.
 - c. References included in the preceding exercises which deal with this subject.
13. Be prepared to show the value and significance of the Emancipation Proclamation. Why were amendments to the Constitution of the United States necessary? This problem will be discussed in class.
14. Reconstruction of the South does not constitute a phase of this unit, as outlined, but this story may be studied as supplementary work. The references given below contain material dealing with the subject of Reconstruction. If a voluntary extra project is prepared on this subject, the directions for preparing an extra project given in Exercise 11, Unit Two, should be reviewed.
 - a. Reconstruction, 6024.
 - b. Tenure of Office Act, 7110.
 - c. Ku-Klux Klan, 3818.
 - d. Negroes in the United States, 4871.
 - e. Liberal Republican Party, 3961.
 - f. Rutherford B. Hayes, 3096.
 - g. Andrew Johnson, 3685-3686.
 - h. Carpetbaggers, 1211.
15. There are five major divisions in this unit: (1) Early Slavery in America; (2) Contests over the Growth of Slavery; (3) The Secession Movement; (4) The War of Secession, and (5) The End of Slavery. Indicate in which division each of the following statements belongs by placing a figure 1, 2, 3, 4, or 5 after each:
 - a. The election of Lincoln was the immediate cause of the South Carolina Ordinance of Secession.
 - b. Until the invention of the cotton gin, the great obstacle to success in the cotton trade was the difficulty in separating the cotton seed from the fiber.
 - c. The Missouri Compromise stated that Maine was to be admitted into the Union as a free state, Missouri as a slave state, but the territory included in the Louisiana Purchase was to be forever free.
 - d. The Kansas-Nebraska Act caused much trouble in Kansas.
 - e. Many slaves were brought to this country from Africa.
 - f. William Lloyd Garrison criticized the Constitution because it recognized slavery.
 - g. Southern leaders desired to create new slave states in the west.
 - h. The Compromise of 1850 delayed the War of Secession ten years.
 - i. Southern leaders stated that a state had sovereign power, and could withdraw from the Union when it chose.
 - j. Very early in the nation's history freedom was given to negroes in the North.
 - k. The decisive victories at Gettysburg and Vicksburg encouraged the Union commanders to hope for a speedy conclusion of the war.
 - l. The Thirteenth and Fourteenth Amendments were added to the Constitution in consequence of the War of Secession.
 - m. The election of 1860 had an important bearing upon the slavery controversy.

- n. Slavery, which was introduced into Virginia, rapidly spread to other colonies.

A Test in Understanding

Place a cross (x) before each correct answer to a question, and a question mark (?) before each answer which is debatable. Do not mark incorrect answers in any way. Be prepared to justify your selections.

1. What caused the increased demand in the Southern states for slaves?
 - a. The cheap slave labor.
 - b. The invention of the cotton gin.
 - c. The unfriendly attitude of the North.
 - d. The high price of slaves in Africa.
2. Why was slavery abolished in the North during the generation following the Revolution?
 - a. Slavery did not pay in the North.
 - b. Slaves were not healthy in the North.
 - c. Slavery was attacked by leading statesmen.
 - d. English laborers influenced Northern business men.
3. What was said about Louisiana Territory in the Missouri Compromise settlement?
 - a. The greater portion was to be slave territory.
 - b. The greater portion was to be free territory.
 - c. The land was to be half slave and half free.
 - d. Nothing should be done about slavery until 1860.
4. What was the effect of the Compromise of 1850?
 - a. The country seemed pleased with the result.
 - b. The North admitted that secession was legal.
 - c. Louisiana territory became all free.
 - d. Lincoln asserted the rights of Illinois.
5. According to the Kansas-Nebraska Act, who was to determine whether Kansas was to be free or slave territory?
 - a. Congress.
 - b. The people of the United States.

- c. The President of the United States.
- d. The people of Kansas.
6. What was the attitude of Lincoln concerning the slavery question?
 - a. He demanded that slavery be abolished at once.
 - b. He demanded that the slave owners be punished.
 - c. He suggested that the negroes be permitted to vote.
 - d. He suggested that slavery be gradually abolished and the slave owners paid.
7. What was the real cause of secession?
 - a. The Southern states desired to protect slavery.
 - b. Lincoln demanded that slavery should be immediately abolished.
 - c. The Southern armies captured Fort Sumter.
 - d. Lincoln obtained English aid to defeat slavery.
8. What was the influence of the blockade?
 - a. It caused the South to win on land.
 - b. It was responsible for England's friendship.
 - c. It aided the North in getting French help.
 - d. It prevented the South from trading with other countries.
9. What was the theory of secession?
 - a. A state may withdraw from the Union whenever it feels its rights are no longer protected.
 - b. The Union may remove a state whenever it feels the state is doing unfair things.
 - c. A Federal officer may resign from office whenever he thinks he has been mistreated.
 - d. Whenever slavery is not acceptable to a given locality, it may be abolished.
10. How was slavery entirely destroyed?
 - a. By the Emancipation Proclamation.
 - b. By the victorious Northern armies.
 - c. By the Thirteenth Amendment.
 - d. By the decline in the price of cotton.

UNIT SEVEN

How Americans Won The West

Exploration Questions

1. Into what two sections of the country did Daniel Boone move his family?
2. How is the name of George Rogers Clark connected with Kaskaskia?
3. What justification is there for calling David Crockett a pioneer who assisted in opening the West?
4. What regions were explored by Kit Carson?
5. What part did Sam Houston play in the winning of the West?
6. What territory was explored by Zebulon Pike?
7. In what respects did the explorations of John C. Fremont differ from the explorations of the six men referred to in the preceding questions?
8. What is the story of the opening of the territory included in the present state of Utah?

9. What is the significance of the name "Buffalo Bill" in the story of the winning of the West?
10. Why should great honor be paid Robert Fulton?
11. How did the first reaper differ from the modern self-binder?
12. What is meant by the statement that "McCormick did more than just invent the reaping machine"?
13. What is the story of the construction of the first important waterway in the United States?
14. To what extent should De Witt Clinton be given credit for the building of a principal waterway in the United States?
15. What part did the "forty-niners" play in the development of the West?
16. What were the enterprises which culminated in the completion of the Great Northern Railway system?
17. What kind of surveys and investigations did Clarence King make in the West?
18. In what regions did John Wesley Powell do important work? How did he aid in the development of the West?
19. Since the beginning of the nation's history, what has been the policy of the national government concerning lands in the West? How has the policy changed at different times?
20. What is the meaning and significance of the term "conservation"?
21. What is the meaning and significance of the term "frontier"?
2. Men and events important in developing the West: Robert Fulton and the steamboat; De Witt Clinton and the Erie Canal; Cyrus McCormick and the reaper; James Marshall and the gold rush to California; James Hill and the Great Northern Railroad; Clarence King and the Geological Survey; John Wesley Powell and irrigation.
3. Results of westward expansion: American character; composite nationality; conservation movement; a national democracy; interruption of established culture.

Study Activities

[Numbers refer to pages in THE WORLD BOOK Encyclopedia.]

1. Prepare a composition entitled "Pioneers Who Opened the West," indicating in the case of each pioneer the territory explored, routes taken, and rôle in the westward movement. The accounts given below are suggestive of the type of material you may include. Other discussions of early pioneers will be found in THE WORLD BOOK. From your study of the six preceding units, you should have a knowledge of many other pioneers, and may include these stories in your paper. For example, Abraham Lincoln moved westward, and Andrew Jackson played a part in the opening of the West; yet these two characters are not included in the references below:
 - a. Daniel Boone, 858-859, 3762.
 - b. George Rogers Clark, 1455, 3360.
 - c. David Crockett, 1749.
 - d. Kit Carson, 1218.
 - e. Sam Houston, 3264-3265.
 - f. Zebulon Pike, 5614.
 - g. John C. Fremont, 2605-2606.
 - h. Brigham Young, 7951; Mormons in Utah, 4655-4656.
 - i. William Cody, 1525.
2. Read the following stories of men who aided in developing the West. Take notes on this material in preparation for the exercises which are to follow:
 - a. Robert Fulton, 2634-2635, 7246.
 - b. Cyrus McCormick and the Reaper, 4174, 6015-6018.
 - c. Erie Canal, 2287-2289, 1158-1159.
 - d. Gold Rush in California, 1093-1094, 2858.
 - e. James J. Hill, 3179.
 - f. Railroads in the United States, 5976-5977.
 - g. Clarence King, 3792.
 - h. Geological Survey, 2731-2732.
 - i. John Wesley Powell and Irrigation, 5791, 3553-3554.
3. On pages 3497-3500 you will find a list of

Analysis of the Unit

LEARNING OBJECTIVE

The opening and development of the West caused a change in American character, created governmental, as well as social, problems, and resulted in a temporary decline in culture.

ELEMENTS OF UNDERSTANDING

1. A group of hunters and traders opened the West for settlement and gradually pushed across the continent.
2. The development of the West depended upon means of transportation, government land policies, and inventions of farm machinery.
3. The westward movement across the continent caused many changes which have proved significant in American life.

Assimilative Material

1. Pioneers in opening the West: Daniel Boone; George Rogers Clark; David Crockett; Sam Houston; Zebulon Pike; Kit Carson; John Fremont; Brigham Young; Buffalo Bill.

inventors and their inventions. Select the American inventions which you think influenced the development of the West, and write a short paragraph for each, indicating how the invention aided in this development.

4. The following accounts contain materials relating to the subject of study. Read each one carefully, and be prepared to discuss in class how the subject matter explains this unit:
 - a. Cumberland Road, 1784.
 - b. Lincoln Highway, 4022-4024.
 - c. Trails of Early Days, 7237-7239.
 - d. Water and Rail Transportation, 7380-7385.
 - e. The American Canal at Sault Ste. Marie, 6400.
 - f. Story of Roads in the United States, 6140-6145.
 - g. Railroads in the United States, 5976-5977.
 - h. New York State Barge Canal, 4997-4998.
 - i. Lakes-to-Gulf Waterway, 3845.
5. Illustrate by means of a cartoon or a map the part transportation played in the development of the West.
6. Explain in a short paper the justification for naming one division of this unit "Pioneers in Opening the West," and another division "Men and Events Important in Developing the West." You will be expected to show that the materials of one division do not belong in the other division.
7. Read the story of Conservation on page 1623, and the stories suggested under "Related Subjects." This material will be discussed in class.
8. Study the following sentence carefully and be prepared to discuss it in class: "With the development of the West, a sturdy American manhood developed, a composite nationality formed, the conservation movement was made necessary, a national democracy was realized, and the orderly progress of culture was interrupted."
9. Draw a picture, diagram, or cartoon showing the significance of westward expansion to the Pacific Ocean.
10. Read the discussion "Disposal of Public Lands," page 3853, and write a paper of at least three pages indicating (1) the content of this material, and (2) its significance in the story of "How Americans Won the West."
11. Be prepared to name the problems of the West, and indicate how each affects our national government.
12. Tell why the United States government should enforce a rigid conservation pol-

icy, and indicate how this can be done.

13. Write a two-hundred word reaction to the following statement taken from an editorial, "The New Frontier," which appeared in the *Chicago Tribune*, Sunday, July 6, 1930: "The cities are the frontier of 1930."
14. After you have completed the thirteen preceding exercises, write a comprehensive discussion of any subject listed below. You may desire to follow the directions, "How to Prepare an Extra Project," given in Unit Two. This is supplementary work, for which extra credit will be given:
 - a. Why people went west.
 - b. Kinds of people who went west.
 - c. Routes taken by the pioneers.
 - d. Dangers of frontier life.
 - e. What people did in the West.
 - f. How the frontier people dressed.
 - g. Amusements in the great West.
 - h. Homes on the frontier.
 - i. Methods of travel in the West.
 - j. Education in the new West.
 - k. Hardships of western life.
 - l. Character and ideals of the pioneers.
 - m. How the frontier people wasted natural resources.
 - n. Health in a frontier community.
 - o. Improvements made by the frontiersmen.
 - p. Importance of social gatherings.
 - q. Woodcraft on the frontier.
 - r. Frontier trading.
 - s. Democracy of the frontier.

A Test in Understanding

Place a cross (x) before each correct answer to a question, and a question mark (?) before each answer which is debatable. Do not mark incorrect answers in any way. Be prepared to justify your selections:

1. Why did the early pioneers move westward?
 - a. To escape unfair court decisions.
 - b. To find adventure and better living conditions.
 - c. To organize companies to fight the Indians.
 - d. To show England their independent spirit.
2. What was the effect of the frontier on the early pioneers?
 - a. It made them democratic.
 - b. It made them selfish.
 - c. It made them dependent.
 - d. It made them contented.
3. How was the land west of the Appalachian Mountains obtained by the United States?
 - a. England gave the land to the United States by the treaty which closed the American Revolution.

- b. France sold the land to the United States.
- c. By exploration, purchase, conquest, and treaties.
- d. The United States seized the land and settled it.
4. What was the urgent need of the new West?
 - a. The need for internal improvements.
 - b. The need for courageous men and women.
 - c. The need for animals to stock the land.
 - d. The need for negroes to cultivate the soil.
5. How did the Federal government influence the westward movement?
 - a. By selling Western land to corporations.
 - b. By granting democratic government to Western states.
 - c. By giving away the Western land at a cheap price.
 - d. By aiding internal improvements.
6. What was the chief influence of the early railroads?
 - a. They made possible the opening of the country between the Great Lakes and the lower Mississippi.
 - b. They caused big business to lose money, thus developing class spirit in early America.
 - c. They caused England to take a new attitude toward American commerce and trade.
 - d. They made possible the development of great sections which were far from waterways.
7. In what way was the Erie Canal of benefit to the people of the West?
 - a. More water was made available for irrigation purposes.
 - b. Eastern manufactured goods could be bought cheaper.
 - c. The railroads were forced to lower rates.
 - d. Men who were out of employment were given work.
8. What is the conservation movement?
 - a. A movement to tax people who control natural resources.
 - b. A movement to hasten the use of the natural resources.
 - c. A movement to protect natural resources by stopping waste.
 - d. A movement to give big corporations the use of water power.
9. What was the effect of the westward movement upon American nationality?
 - a. It caused the people to broaden their interests and become nationally minded.
 - b. It caused the people to become more conservative and state-minded.
 - c. It caused the people to become more interested in the institutions of Europe.
 - d. It caused the people to become divided on the question of national and state interests.
10. What was the effect of the westward movement upon the established culture of the country?
 - a. It gave that culture to the frontiersmen.
 - b. It interrupted the development of the established culture.
 - c. It greatly improved the culture.
 - d. It had no effect upon the culture.

UNIT EIGHT

The Coming of Big Business

Exploration Questions

1. How was manufacturing done in the English colonies during the colonial period?
2. What two conditions led to the rapid development of establishments using power machinery rather than hand tools?
3. Why did manufacturing develop early in the states along the Middle Atlantic coast?
4. What was the attitude of the early settlers in Pennsylvania toward the newly found petroleum?
5. What was the condition of industry in Pennsylvania during the Revolutionary period?
6. What was the Astor family in an earlier day called? Why?
7. How did the stony farmlands of Massachusetts affect the development of industry in that state?
8. How did Cornelius Vanderbilt effect a change in the character of American business and industry?
9. What were the steps that led up to the organization of the Standard Oil trust?
10. What effect did the Sherman Law have upon the Standard Oil trust?
11. How is drilling for petroleum done?
12. What were the principal steps in the development of the United States Steel Corporation?
13. Who introduced the Bessemer process into the American steel industry?
14. What tremendous responsibility was placed upon the shoulders of Elbert H. Gary? How was he responsible for the organization of a great and powerful combine of industries?
15. What are the essential steps in the process of manufacturing steel?

16. How would you summarize the condition of America, industrially, in 1860?
17. What five factors were responsible for the change in the character of business and industry following 1860?
18. To what extent had large-scale production been employed in the cloth industry before 1860?
19. What people have been responsible for the development of the moving-picture industry?
20. What justification is there for saying that the development of motion pictures is a phase of the development of big business in this country?
21. How did the first picture trust develop?
22. What figures may be given to show the widespread popularity and the universal use of automobiles?
23. In what respects did the development of the automobile industry differ from the development of other leading industries in the United States?
24. How can the importance of the meat-packing industry be shown?
25. How is the meat-packing industry organized?
26. What assurance do we have that all meat which comes from the packing houses is fit for food?
27. What importance do you attach to railroad refrigeration?
28. What explanation is there for the fact that the modern department store has proved one of the greatest economic successes of the times?
29. What are the advantages and the disadvantages of the chain-store development?
30. What justification is there for saying that organized baseball is a phase of big business?
31. How has agriculture been changed during recent years as a result of the era of big business?

Analysis of the Unit

LEARNING OBJECTIVE

The change in American business and industry from the period of small factories and individual control to the era of consolidation under large corporations has resulted in many changes significant in the life of the nation.

ELEMENTS OF UNDERSTANDING

1. During the colonial and Revolutionary days, business and industry were controlled by individuals and small companies.
2. Following the War of Secession, large corporations were formed to develop American business and industry.
3. The development of business and industry,

- which is a continuous process, has increased wealth and consolidated fortunes.
4. The development of big business resulted in many changes significant in the life of the nation.

Assimilative Material

1. Industrial America in 1860: Natural resources undiscovered; business controlled by individuals and small companies—oil companies of Pennsylvania, mower and reaper companies of New York; ownership of land the chief form of wealth—the Astor family of New York.
2. Change in character of business and industry: Cornelius Vanderbilt and the New York Central Railroad; John D. Rockefeller and the Standard Oil Company; Andrew Carnegie and the development of the steel industry.
3. Development of American business and industry: The meat-packing industry; the department store; the motion-picture industry; the automobile industry; the cloth industry; organized baseball.
4. Results of business and industrial development: Growth of cities; consolidation of fortunes; increase in wealth; improved conditions of life.

Study Activities

[Numbers refer to pages in THE WORLD BOOK Encyclopedia.]

1. After reading the following accounts, write a comprehensive discussion of industrial America in 1860 and the change in the character of business and industry during the succeeding years. You are not expected to include all of the material given in the references. Summarize, generalize, and indicate the major understandings:
 - a. Development of Manufacturing Industries, 7377-7380.
 - b. History of Pennsylvania, 5471, 5521, 5467-5468.
 - c. Astor Family, 465.
 - d. History of Massachusetts, 4330-4331.
 - e. History of Virginia, 7541.
 - f. Cornelius Vanderbilt, 7458-7459.
 - g. Railroads in the United States, 5976-5977.
 - h. John D. Rockefeller, 6153.
 - i. Standard Oil Company, 6798-6799.
 - j. The Petroleum Industry, 5522-5529.
 - k. Andrew Carnegie, 1202-1203.
 - l. Elbert H. Gary, 2697.
 - m. The Story of Iron, 3534-3551.
 - n. United States Steel Corporation, 7411-7412.
 - o. Sir Henry Bessemer, 721.
2. There will be a class discussion of the de-

velopment of American business and industry. Read as many accounts of this subject as you can in preparation for the class work. The following accounts are suggestive, but are not the only ones that may be found in THE WORLD BOOK dealing with the subject. Select other accounts which explain this subject, and read them carefully. Keep a list of everything that you read:

- a. The Cloth Industry, 1489-1491.
- b. The Moving-Picture Industry, 4703-4729.
- c. The Story of the Automobile, 534-546.
- d. Meat-Packing Industry, 4361-4368, 6042-6044.
- e. The Department Store, 1910-1911.
- f. Chain Stores, 1295.
- g. Organized Baseball, 634.
- h. The Story of Agriculture, 93-100.
3. Make a two-column tabular chart, and indicate the advantages and disadvantages of corporation control of business and industry. Include the advantages in one column, and the disadvantages in the other column.
4. Write a theme of at least three pages explaining the following statement: "Large-scale development of American business and industry depended upon the vision and energy of leaders in our industrial life."
5. Be prepared to explain in class how American fortunes became consolidated. The accounts you have already read contain material on this subject.
6. Prepare a list of commodities and conveniences manufactured as the result of big business which have improved living conditions. Indicate in each case how living conditions have been improved.
7. Prepare a floor talk entitled "Results of Business and Industrial Development." Include the following topics: Growth of cities, consolidation of fortunes, increase in wealth, and improved conditions of life.
8. Be prepared to show that the development of industrial America is a continuous process. You will be called upon to indicate some important recent developments in business and industry.
9. The following references explain phases of business and industry which are not included in this eighth unit. After reading the accounts given below, write a review of each, indicating the most significant points. You will find some references which might be included in the story of this unit as outlined in the "Assimilative Material," and some accounts which are irrelevant to the story of this eighth unit as outlined. Select those discussions which you think ex-

plain the analysis of the unit just completed, and indicate the element of understanding which each discussion explains.

- a. Board of Trade, 808-810.
- b. Blue Sky Laws, 806.
- c. Bimetallism, 740.
- d. Adamson Law, 35.
- e. Banking in the United States, 606-610, 602-603.
- f. William Jennings Bryan, 986-987.
- g. Story of Tariff in the United States, 7022-7024.
- h. Story of the Thirtieth President, 1651-1659.
- i. Thomas Alva Edison, 2108-2110.
- j. Populist Party, 5740.
- k. Federal Farm Loan Board and Banks, 6251-6252.
- l. Chamber of Commerce of the United States, 1298-1299.
- m. Development of Manufacturing Industries, 7377-7380.
- n. Samuel Gompers, 2868.
- o. Greenback Party, 2956-2957.
- p. Income Tax, 3374-3375.
- q. Interstate Commerce, 3490-3491.
- r. Monetary System of United States, 4586-4589.
- s. Trust Legislation, 7284.
- t. Story of Civil Service, 1449-1451.

A Test in Understanding

Place a cross (x) before the word or words which complete correct statements and a question mark (?) before the word or words which complete debatable statements:

1. During the early part of the nineteenth century the most important industry was—
 - a. mining.
 - b. steel refining.
 - c. farming.
 - d. cabinet-making.
2. During the War of Secession and the period immediately following, business was controlled—
 - a. by big corporations.
 - b. by government agents.
 - c. by individuals and small companies.
 - d. by Southern plantation owners.
3. The early colonists had to be—
 - a. Jacks of all trades.
 - b. experts in all fields.
 - c. experts in special fields.
 - d. large-scale manufacturers.
4. Work in the colonial time was done—
 - a. by machinery.
 - b. by water power.
 - c. by hand.
 - d. by the Indian slaves.
5. Leaders in the business world have formed combinations—

- a. to gain greater profits through mass production.
- b. to ruin the small business man.
- c. to destroy government control.
- d. to take advantage of the public.
6. The corporation became a common form of business organization—
 - a. immediately following the War of Secession.
 - b. during the Revolutionary War.
 - c. during the colonial period.
 - d. after 1900.
7. Sixty years ago the fresh meats that were served on peoples' tables were, for the most part—
 - a. produced in European countries.
 - b. produced in large cities.
 - c. produced in local communities.
 - d. produced in the Southern states.
8. The importance of the Chicago packers in the business world is due—
 - a. to the demands of Easterners.
 - b. to the invention of the refrigerator car.
 - c. to the invention of the meat cutter.
 - d. to the demands of the far North.
9. In large-scale production—
 - a. by-products are destroyed.
 - b. by-products are used.
 - c. workers are paid low wages.
 - d. railroads cannot be used to advantage.
10. Big business in the United States to-day is—
 - a. confined to the Northern states.
 - b. independent of European countries.
 - c. controlled by Henry Ford.
 - d. developing in all sections of the country.

UNIT NINE

How America Became A World Power

Exploration Questions

1. What was the extent of the territory of the United States at the close of the Revolution?
2. To what extent was American commerce developed at the close of the Revolution?
3. What indication have we of the lack of influence of this country at the close of the Revolution?
4. Why was the American nation surprised at the arrangements by which Louisiana was transferred from French to American possession?
5. What may have been an important factor that caused Napoleon to offer to sell Louisiana?
6. What American began negotiations for the purchase of Louisiana, and because of his work deserves much credit for the achievement?
7. What should be remembered concerning the acquisition of Florida?
8. What were the principal events of Mexican and American history which led up to the establishment of the independent government of Texas?
9. Of what territorial significance to the United States was the Treaty of Guadalupe Hidalgo?
10. What proof do we have that the annexation of Texas was for a time opposed by many Americans?
11. What was the significance of the siege of the Alamo and the destruction of the garrison?
12. What justification was there for President Polk's statement to Congress that war existed "through the act of Mexico herself"?
13. What was the real attitude of President Polk concerning the Texas question?
14. What attitude did the people of Texas take which gave the United States some justification for the annexation of Texas?
15. How was the dispute over the boundary line between Mexico and the United States, which grew out of the treaty which closed the Mexican War, finally settled?
16. What was the extent of United States territory in 1890?
17. What was the country's financial position in 1890?
18. To what extent was industry developed by 1890?
19. At approximately what time did the United States take an active interest in Samoa? What other indications have we of American interest in Samoa? At what time was Samoa acquired by the United States?
20. At approximately what time did the United States show an interest in China by concluding a treaty with that nation?
21. Under whose leadership did the United States first enter world affairs?
22. What islands belong to the United States?
23. Of what particular value to the United States is Tutuila?
24. Which of the American Samoan Islands is the most important?
25. At what time in the nation's history did Commodore Matthew C. Perry visit Japan? What success did Perry have in Japan?
26. In what way did the Hawaiian Islands indicate a desire to be annexed by the United States?

27. At what time and in what manner was Hawaii annexed by the United States?
28. At what time were negotiations begun for the sale of Alaska to the United States? When was the transfer made?
29. Why was the Spanish-American War fought? How did the United States gain by that war?
30. What territory was acquired by the United States at the close of the Spanish-American War?
31. What is the meaning of the term "imperialism"?
32. What was the attitude of Admiral Dewey toward Aguinaldo?
33. How has American control in the Philippines increased the nation's international prestige?
34. What arrangements were made between the United States and Cuba at the close of the Spanish-American War? What have been the arrangements since that time?
35. How did Porto Rico come into the possession of the United States?
36. What justification is there for the statement that the United States was not a world power until after the Spanish-American War?
37. What is meant by "America's peaceful attitude in 1914"? In what particulars did the causes of war accumulate?
38. What led President Wilson to ask Congress to declare that a state of war existed?
39. How did the conduct of the World War bring the nation to a position of world leadership?
40. What is meant by the statement that the United States became a great world power because of the World War?

Analysis of the Unit

LEARNING OBJECTIVE

America's continuous territorial growth, its trade negotiations since the Revolutionary War, and its activity during the period of the World War made the nation a great world power.

ELEMENTS OF UNDERSTANDING

1. At the close of the Revolution, America was unable to command the respect of the world.
2. Through purchase, annexation, and cession, the territory of the United States was extended to the Pacific Ocean.
3. By 1890, the United States had come to a position which commanded the respect of the world.
4. During the nineteenth century, America showed tendencies toward world expansion by entering into treaties and

trade negotiations with the Far East, and by annexation of Atlantic and Pacific possessions.

5. During the World War period, the United States, because of financial, industrial, and commercial leadership, notably improved its standing among recognized world powers.

Assimilative Material

1. America at the close of the Revolution: Extent of territory; number of people; extent of commerce; lack of influence.
2. Expansion to the Pacific: Thomas Jefferson and the Louisiana Purchase; John Quincy Adams and the acquisition of Florida; Sam Houston and the annexation of Texas; James Polk and the Mexican Cession; the Gadsden Purchase.
3. Position of America in 1890: Territorial; financial; industrial.
4. Tendency toward world expansion: Treaties with China and Siam; annexation of Atlantic and Pacific islands; relations with Samoa; the opening of Japan to commerce by Perry; annexation of Hawaii; the Alaska purchase; Spanish-American War—Porto Rico, the Philippines.
5. The World War: Causes—commercial rivalry, territorial disputes; the submarine and America's entrance into the conflict; Pershing in France—Château-Thierry, the Argonne; peace; America's position since 1918.

Study Activities

[Numbers refer to pages in THE WORLD BOOK Encyclopedia.]

1. Review the story "How America Became an Independent Nation" (Unit Three) and the story "How We Secured Our National Government" (Unit Four), and write in tabular form items which explain the position of America at the close of the Revolutionary War. Devote one column to "extent of territory," one column to "number of people," one column to "extent of commerce," and one column to "lack of influence." The story of the United States, 7362-7393, contains material useful in the preparation of this exercise.
2. Be prepared to indicate why the story of America at the close of the Revolution as outlined in the preceding exercise is included in this unit. This question will be discussed in class.
3. Write a paper of not more than two pages explaining how the United States secured Louisiana. 4134, 4061, 3650, 7396, 3853.

4. Be prepared to explain in class how the United States secured Florida. 32, 2482, 3853.
5. Prepare an outline of the principal events in the story of the annexation of Texas. 7130, 165, 4430-4432, 5709, 7038.
6. Be prepared to explain the part taken by James K. Polk in the expansion of America to the Pacific.
7. Indicate in a short paragraph the significance of the Gadsden Purchase. 2657.
8. Select the most significant events about which you read in exercises 3, 4, 5, 6, and 7, and write a comprehensive story of the expansion of the nation to the Pacific Ocean. "The History of American Acquisitions," 3853, and the account of "Annexation," 293-294, should be read before the story is written.
9. Review the references you have already read which indicate the position of America in 1890. Prepare a tabular chart similar to the one prepared for Exercise 1, devoting one column to "extent of territory," one column to "financial position," and one column to "industry." The purpose of this exercise is to show the advance made during the period 1789-1890.
10. After reading the following references, write a comprehensive story explaining the tendency of the United States toward world expansion:
 - a. Territorial Expansion, 7386.
 - b. China—Increased Intercourse with the World, 1396.
 - c. John Hay, 3092, 5213.
 - d. History of Siam, 6585.
 - e. Islands of United States (each also listed separately), 3566.
 - f. Samoa, 6353-6356.
 - g. Commodore Perry in Japan, 3636, 5491-5492.
 - h. History of Hawaii, 3084, 3085.
 - i. Alaska Purchase, 175.
 - j. Imperialism, 3370.
 - k. Spanish-American War, 6738-6741, 4190.
 - l. Treaty of 1898, 5381.
 - m. Aguinaldo, 107.
 - n. The Rough Riders, 6188.
 - o. Theodore Roosevelt—Foreign Relations, 6190-6192.
 - p. History of the Philippine Islands, 5556-5563.
 - q. Guam, 2972.
 - r. Manila, 4257-4259.
 - s. Igorote, 3348.
 - t. Richmond Pearson Hobson, 3189.
 - u. History of Cuba, 1772-1775.
 - v. History of Porto Rico, 5755.
 - w. George Dewey, 1926.
 - x. Isle of Pines, 3566-3567.
11. Outline both sides of a debate upon the following subject: "Island possessions of the United States are of great value to our country."
12. Write a two-page reaction to the following statement: "The United States from a very early date in specific instances indicated a desire to enter world affairs."
13. Be prepared to discuss in class whether or not the United States was justified in fighting Spain in 1898.
14. The story of the World War is told in the following accounts. Read each very carefully, and prepare notes indicating the material you think most significant in showing *how America became a world power*. Remember that while much of the material is of interest, it has little value in explaining the learning objective of this unit. Be prepared to show the significance of this last statement.
 - a. The United States in the World War, 7883-7892.
 - b. War Debts, 7595-7600.
 - c. Volunteers, 7567.
 - d. Treaty of Versailles, 7506-7508.
 - e. League of Nations, 3904-3906.
 - f. Mandated Territories, 4253.
 - g. Robert M. La Follette, 3840.
 - h. Count von Bernstorff, 720.
 - i. Conscription in the United States, 1622.
 - j. Edward M. House, 3261.
 - k. Robert Lansing, 3873.
 - l. John J. Pershing, 5494-5495.
 - m. The War in the Air, 127-129.
 - n. Red Cross in the World War, 6026.
 - o. William Gibbs McAdoo, 4167-4168.
 - p. The Story of Herbert Hoover, 3230-3231.
 - q. Armistice Day, 410.
 - r. Permanent Court of International Justice, 5489-5490.
 - s. Dawes Plan, 1841-1842.
 - t. International Settlements, 3488-3489.
15. Prepare a defense for either side of the following question: "The United States was justified in entering the World War."
16. In outline form indicate *exactly* what the United States contributed to the success of the allied nations.
17. Be prepared to tell the class how the World War brought the United States to a position of world supremacy.
18. The following supplementary accounts should be read by pupils who complete the above exercises before other members of their class. A brief summary of each should be written, indicating what phase of the unit the material explains.
 - a. Virgin Islands, 7546-7547.
 - b. Henry L. Stimson, 6835.

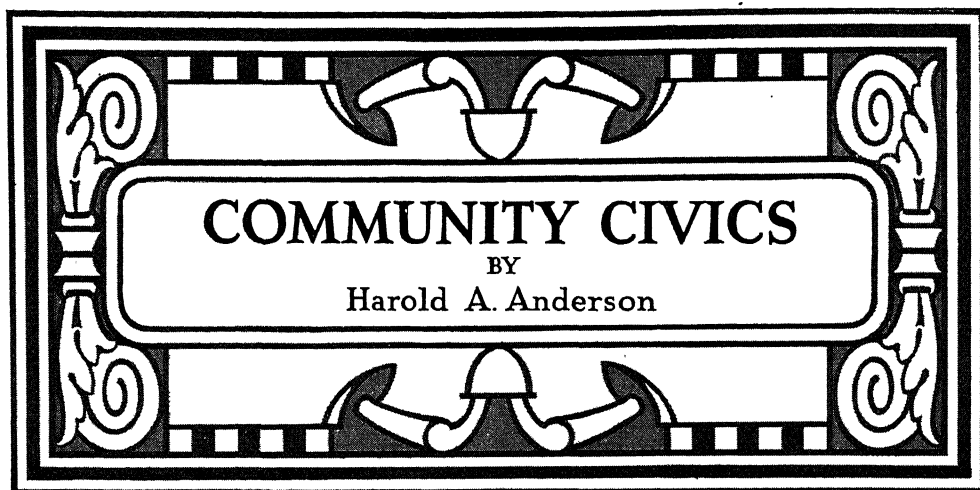
- c. Santo Domingo, 6381-6382.
- d. William Crawford Gorgas, 2875.
- e. History of Haiti, 3012-3013.
- f. Boxer Rebellion, 900-901.
- g. Story of Panama Canal, 5330-5337.
- h. Pan-American Congress, 5337-5338.
- i. Nicaragua Canal, 5018-5019.
- j. Clayton-Bulwer Treaty, 1460.
- k. Hay-Pauncefote Treaty, 3101.
- l. Bering Sea Controversy, 713.
- m. John Bassett Moore, 4644-4645.
- n. Monroe Doctrine, 4608.
- o. Dwight Morrow, 4663-4664.
- p. Distinguished Service Medals, 1968-1970.
- q. Northwest Territory, 5079-5080.
- r. Merchant Marine of the United States, 4404-4406.
- s. The Story of Aircraft, 134-151.
- t. Webster-Ashburton Treaty, 7698.
- u. Charles A. Lindbergh, 4025-4030.
- v. American Legion, 250-252.
- w. David Starr Jordan, 3697.
- x. Richard E. Byrd, 1053-1054.
- y. Kellogg-Briand Treaty, 6058-6059.

A Test in Understanding

Place a cross (x) before the best answer to each question, and a question mark (?) before each answer which is debatable. Be prepared to justify your selections:

1. What part of the present United States was settled at the close of the Revolution?
 - a. The territory from the Atlantic Ocean to the Mississippi River.
 - b. The territory from the Atlantic Ocean to the Alleghanies.
 - c. The territory from the Gulf of Mexico to the Pacific Ocean.
 - d. The territory from the Atlantic to the Pacific Ocean.
2. What territory was added to the United States during the administrations of Thomas Jefferson?
 - a. Texas.
 - b. New Amsterdam.
 - c. Oregon.
 - d. Louisiana.
3. In what way did America profit by the war with Mexico?
 - a. Much new territory was added to the country.
 - b. Much gold and silver was paid the government.
 - c. Europe was forced to buy goods from American manufacturers.

- d. The Mexican government offered land to American soldiers.
4. Why did America, during the early years of its existence as a nation, steer clear of entangling relations with other nations?
 - a. Because the people in America respected Washington's advice.
 - b. Because the nation was weak.
 - c. Because Americans hated Europeans.
 - d. Because Americans were busy developing the country.
5. What indicated America's tendency toward world expansion?
 - a. Treaties with China and Siam.
 - b. Acquisition of Florida.
 - c. Annexation of Hawaii.
 - d. Development of western states.
6. When did the United States first show its expansive tendencies?
 - a. In 1830 and 1840.
 - b. After 1900.
 - c. During the War of Secession.
 - d. Before the War of 1812.
7. What part did Perry play in America's expansion policy?
 - a. He established commercial relations with Japan.
 - b. He showed the advantage of a large army.
 - c. He opened the Philippines to commerce.
 - d. He brought Germany to terms.
8. How was the foreign policy of the United States changed in 1898?
 - a. European friendships were discouraged.
 - b. The money supply was decreased.
 - c. South American friendships were discouraged.
 - d. A program of world expansion was launched.
9. What caused America to enter the World War?
 - a. Hatred of the German nation.
 - b. Fear of Mexico.
 - c. Submarine warfare.
 - d. Desire for world trade.
10. What effect did the World War have upon the United States?
 - a. It caused a financial crisis in America.
 - b. It made the United States a selfish nation.
 - c. It caused serious trouble between the United States and England.
 - d. It made the United States a financial, industrial, and commercial leader among nations.



The following outline of Community Civics includes materials usually found in civics courses in junior and senior high schools. The course is divided into five parts, each part representing one of the larger phases of civics—social, community, political, economic, and vocational—ordinarily treated in social-science textbooks.

Part One is devoted to the nature of group and community life and the chief characteristics of three fundamental social institutions,—the family, the school, and the church. Part Two deals with six important problems affecting community welfare, namely, assimilating the immigrant, safeguarding health, protecting life and property, providing recreation, planning communities, and aiding the handicapped. The machinery and functions of American political institutions are discussed in Part Three. Attention is given to how we govern ourselves, how laws are made, how laws are enforced, how laws are applied and interpreted, how we select our officials, how we finance our government, and international relations. Part Four develops the elementary concepts and fundamental principles of economic civics. This section deals with producing goods, exchanging goods, communication, transportation of goods and people, and thrift and conservation. The last division, Part Five, presents the problems of choosing a vocation and making a living.

While the organization follows in general the courses offered in the University of Chicago High School, certain modifications have been made in order to meet the practical classroom needs of the teacher of civics. To this end, thirty-five representative textbooks and manuals in social science were carefully examined. Chapter titles and major topics were tabulated for the purpose of discovering those aspects of civics which are most widely taught in junior and senior high schools. The following study guides should therefore be useful in connection

with any representative textbook in civics.

The course contains twenty-five units, each of which represents not merely a body of subject matter but a significant unit of learning which should generate adaptations to the social environment. Each unit, in turn, has been analyzed into its elemental understandings. Each element is, in a sense, a unit in itself. It is urged, therefore, that the student regard the elements as unit understandings out of which grows the unit-learning.

How To Use the Study Guides

Supplementary Material. Several purposes have guided the preparation of these study outlines. In the first place, perhaps their greatest value will be found in their use as supplementary material to a basic textbook. The nature of a textbook does not lend itself to a lengthy treatment of even the most important topics. The terse, concise discussion of civics found in textbooks frequently fails to motivate in the pupil an interest in the subject. Furthermore, a textbook must necessarily be limited in its scope, and it cannot contain all of the significant aspects of community civics usually embodied in an encyclopedia. Thus the accounts in *THE WORLD BOOK* may be used advantageously to illuminate and vitalize the text material.

Many procedures are possible in the use of the guides as supplementary material. The alert teacher will use the materials in a way which will best serve the classroom needs. However, certain suggestions will be given here. Except in the case of a few units, the references have been grouped according to the elements of the unit. It is suggested that the student read all of the references of a given element first. Before he proceeds to the next element, he should test his understanding of the materials read by answering the questions listed under Questions, Problems, and Exer-

cises. The questions may be used, too, to stimulate and invigorate class discussion. The problems and exercises should serve several purposes, such as providing opportunities for written work, oral reports, debates, and informal group discussion.

The topics listed under Supplementary Enterprises are intended for students who wish to do voluntary supplementary work. The subjects are adaptable to valuable oral and written reports. The teacher will find the topics helpful in assigning supplementary work to superior students. Pupils who wish to undertake these projects should expect to go beyond the resources of *THE WORLD BOOK*.

Home Study. Pupils who for any reason find it necessary or desirable to do a part or

all of their school work in this subject at home will find the study outlines particularly helpful. It should be possible for a capable pupil to complete on his own initiative and under the guidance of these materials a course in community civics. Adults, also, who may wish to further their education at home will find these pages of valuable assistance.

Other Uses. A number of additional uses suggest themselves. The course outline and the study helps may be used in connection with Americanization classes, continuation schools and evening schools, adult education, and women's clubs. Wherever there is a quest for information and an intellectual interest in the art of living together, the course outlined in these pages should prove useful.

Outline of Community Civics

Part One. Group Life and Social Institutions

Unit One. Group Life

- A. How We Depend on Others
- B. How Others Depend on Us
- C. How Our Interests Conflict
- D. How Our Conflicting Interests Are Controlled
- E. Teamwork and Coöperation

Unit Two. The Family and the Home

- A. What We Owe to Our Ancestors
- B. How the Family Educates Its Young
- C. Dangers to the Home
- D. How We Can Make Our Homes Ideal

Unit Three. The School and Education

- A. How We Learn
- B. Why We Need Schools

- C. How Schools Are Supported and Controlled
- D. Special Kinds of Schools
- E. How To Get the Most Out of School

Unit Four. The Church and Religion

- A. What Religion Is
- B. Great Religions of the World
- C. The Christian Religion
- D. What the Church Does for the Community

Unit Five. Community Life

- A. Our Relationship to the Community
- B. Early Types of Communities
- C. The Development of a Community
- D. Rural Communities
- E. The Modern City Community
- F. Community Spirit and Neighborliness

Part Two. Community Welfare

Unit Six. The Community and Immigration

- A. Why America Is Called "The Melting Pot"
- B. Our Changing Policy toward Immigration
- C. Contributions of Immigrants to American Life
- D. The Americanization Program

Unit Seven. The Community and Health

- A. Importance of Good Health to the Individual and to the Community
- B. What the Community Does to Safeguard Health
- C. Sacrifices and Contributions of Noted Individuals to Public Health
- D. How the Individual Can Coöperate

Unit Eight. The Community and Protection

- A. Why We Need Protection
- B. Losses from Fire, Accidents, Crime, Natural Disasters, and Fraud

- C. What the Community Does to Protect Life and Property
- D. What the Individual Can Do

Unit Nine. The Community and Recreation

- A. Why We Need Play and More Play Facilities
- B. The Value of Play and Recreation
- C. What the Community Does to Provide Play and Recreation Facilities
- D. Play and Recreation Facilities Provided by Private and Semi-Public Agencies

Unit Ten. Civic Beauty and City Planning

- A. The Appeal of Beauty
- B. City Planning in Ancient Times
- C. City Planning in Europe
- D. Well-Planned Cities in America
- E. Regional and Larger Community Planning

Unit Eleven. The Care and Training of the Handicapped

A. The Blind and the Deaf

- B. The Mentally Handicapped
- C. Crime and the Criminal
- D. Social Welfare Work

Part Three. Our American Political Institutions**Unit Twelve. How We Govern Ourselves**

- A. Why We Need Government
- B. Different Forms of Government
- C. Our Local Governments
- D. Our State Government
- E. Our National Government

Unit Thirteen. How Laws Are Made

- A. Laws and Why We Have Them
- B. How Constitutions Are Made and Changed
- C. How Statute Laws Are Made

Unit Fourteen. How Laws Are Enforced

- A. Enforcing Local Laws
- B. Enforcing State Laws
- C. Enforcing National Laws

Unit Fifteen. How Laws Are Applied and Interpreted

- A. What Courts Are and Why They Are Necessary

- B. Local and State Courts
- C. Federal Courts
- D. Court Procedure

Unit Sixteen. How We Select Our Officials

- A. Political Parties and Why They Are Formed
- B. Political Parties at Work
- C. How We Elect Our Officials

Unit Seventeen. How We Finance Our Government

- A. Why Our Government Needs Money
- B. Sources of Income
- C. Levying and Collecting Taxes

Unit Eighteen. International Relations

- A. How Nations Depend on One Another
- B. Our Relations with Other Countries
- C. Movements for International Peace

Part Four. Economic Civics**Unit Nineteen. Producing Goods**

- A. Why We Work
- B. How We Produce Goods
- C. Industrial Problems

Unit Twenty. Exchanging Goods

- A. Why We Exchange Goods
- B. How We Determine the Value of Goods
- C. How We Exchange Goods
- D. How the Government Protects Us

Unit Twenty-One. Communication

- A. Early Modes of Communication
- B. Telephone, Telegraph, Television, Radio, and Signaling

- C. The Postal Service
- D. The Newspaper

Unit Twenty-Two. Transportation of Goods and People

- A. Early Modes of Transportation
- B. Transportation by Water
- C. Transportation by Land
- D. Transportation by Air
- E. The Government and Transportation

Unit Twenty-Three. Thrift and Conservation

- A. How Goods Are Wasted
- B. Conservation of Natural and Human Resources
- C. How We Can Help Save

Part Five. Occupations**Unit Twenty-Four. Choosing a Vocation**

- A. Why We Need to Work
- B. How To Choose One's Work
- C. How To Prepare for One's Work

Unit Twenty-Five. Making a Living

- A. Agriculture
- B. Forestry and Lumbering

- C. Mining and Oil Refining
- D. Fishing
- E. Building
- F. Manufacturing Goods
- G. Transporting Goods and People
- H. Commercial and Clerical Occupations
- I. Working for the Government
- J. The Professions
- K. Home-Making

Part One. Group Life and Social Institutions

UNIT ONE

Group Life

Elements of the Unit

- A. How We Depend on Others.
- B. How Others Depend on Us.
- C. How Our Interests Conflict.
- D. How Our Conflicting Interests Are Controlled.
- E. Teamwork and Coöperation.

References

[Read all the references first; numbers indicate pages in THE WORLD BOOK.]

Agriculture: The Adams Family Proves the Value of Agriculture. 92
 Story of the Ant. 296-303
 The Story of Bees. 672-682
 Brook Farm. 975
 Character Training. 1304-1308
 Coöperation. 1662-1664, 3445
 Law. 3897
 Custom. 4275, 2636, 3073
 Tattooing. 7030-7031, 5292

Questions, Problems, and Exercises

1. What did the children of the Adams family learn about their relation to the farm? 92
2. List the things you usually eat for breakfast. Then trace each of the items back as far as you can, to show your dependence upon a large number of people. For example, how many people have had a part in the complete preparation of a piece of toast?
3. Does the city resident depend upon more people than the farmer? Is the farmer absolutely independent? Explain.
4. Write a paper explaining how you depend on others for a single article such as a fountain pen, a book, or a football. Mention all the industrial, commercial, and financial establishments you can think of which are in any way connected with the article about which you write.
5. Some of the rules of good health are "Drink plenty of pure water," "Eat wholesome food," and "Breathe deeply and freely of pure air." Do you depend on others in obeying these rules? Explain. Is the country boy more independent than the city boy in this respect? Explain.
6. How many persons are dependent on you? Is the farmer, the grocer, the butcher, the merchant, the manufacturer, or the government dependent on you? Explain. If you drive an automobile, are others dependent on you? How? How do your parents depend on you? Your schoolmates?
7. What is the meaning of the word *interdependence*? (Consult a dictionary.) Are you a member of any group in which there is a great deal of interdependence? Give examples and explain. Do you know of any communities which are interdependent? Any nations?
8. Are individuals, communities, and nations more interdependent or less interdependent now than they were ten or twenty-five years ago?
9. Read carefully the paragraph on *Duties Owed to Others*, 1307. Do you live in a "well-conducted" or an "ill-conducted" community? Give reasons for your answer. Does this paragraph apply equally well to your school? Your family?
10. What is meant by the statement that "Every unprincipled man is a parasite or a sponge"? 1308
11. In what way do you depend upon the past? Read the paragraph on *Our Social Inheritance*, 1308
12. What is meant by the word *coöperative*? Do you know of any organizations in your community which are coöperative enterprises? What is meant by the expression, "joint labor for mutual benefit"? 1662-1664
13. Is there teamwork among ants? Do they depend on one another? Would you call an ant colony a "well-conducted" or an "ill-conducted" community? Why? Are there conflicting interests in an ant colony? 296-303
14. Is there more teamwork and coöperation among bees than among ants? Are bees dependent upon each other? How does the community life of the bees differ from that of the ants? Is there always harmony among bees? 672-682
15. Tell about the experiment in "brotherly coöperation" on the Brook Farm. 975
16. What are some of the difficulties in securing teamwork in a group? Give some examples from your experience. Is selfishness the chief cause of conflicting interests? Explain.
17. Is it true that as civilization develops and individuals and communities become more interdependent, there is also an increase in the number of conflicting interests? Justify your answer by citing several examples.

18. List and discuss several situations in which an individual could not have his own way without doing injustice to others.
19. Explain and illustrate the following statements:
 - a. An individual gains when he conforms to social controls established by the group.
 - b. Society gains when an individual conforms to social controls.
 - c. Social control provides for the greatest good to the greatest number.
20. Define law, public opinion, and custom.
21. Which of the methods of social control mentioned above influences you most? Give reasons.
22. Why do we eat pie with a fork? Why do we drive on the right-hand side of the road?
23. Explain this sentence: "The ant . . . shares with man one dominant trait—it is a strongly social being." 296-299.
24. Do ants and bees have social controls by which they force individual members of their colonies or communities to conform to the wishes of the group? 296-303, 672-682
25. How is the study of the nature of group or community life of value to the individual?

Supplementary Enterprises

(For voluntary oral or written reports)

1. Group Life of Insects and Animals.
2. Coöperative Organizations in My Community.
3. The Independence of Robinson Crusoe.
4. Dependence of Wild Animals on One Another.
5. How My Interests Conflict with Those of Others.
6. How We Depend on the Past and How the Future Depends on Us.
7. How the Interdependence of Nations May Lead to World Peace.
8. How We Depend on Other Nations.
Make a list of the articles which you use daily. In a parallel column, indicate the country from which each article comes.
9. How My Actions Are Influenced by the Thoughts of Others.
10. How I Am Controlled by Law, Public Opinion, and Custom.

UNIT TWO

The Family and The Home

Elements of the Unit

- A. What We Owe to Our Ancestors.
- B. How the Family Educates Its Young.
- C. Dangers to the Home.
- D. How We Can Make Our Homes Ideal.

References

Story of the Ant. 296-303
 Bee (Development and Care of Young). 676-677
 "Home Life" of Birds. 754
 Children's Bureau. 1376-1377
 Societies for Children. 1376
 China (Family Life). 1392
 Homes through the Ages. 1447
 Clans. 1453-1454
 Divorce. 1981
 Heredity. 3158-3161
 Story of Household Arts. 3262-3264
 Interior Decoration. 3478-3482
 Marriage. 4299-4301
 Mother's Day. 4684-4685
 Mothers' Pensions. 4685
 A Neanderthal Family. 4853
 Parent and Child. 5369
 Parent-Teacher Associations. 5369-5370
 John Howard Payne. 5423-5424

Questions, Problems, and Exercises

1. What is the meaning of *heredity*? 3158

2. Are all our peculiarities and characteristics inherited? 3159
3. What are some examples of the social heritage which we receive through the family?
4. List and discuss all the ways in which the family educates its young. 3262
5. Have you ever seen an animal teach its young? If so, tell what you saw.
6. Do birds care for their young? 754. Do ants? 299. Do bees? 676
7. In what ways is the family life of birds like the family life of humans? How is it different? 754
8. Describe the "family life" of ants. 296-303
9. Are ants home-loving and home-building insects? 299
10. Describe the "family life" of bees. 676-677
11. Study the picture of a Neanderthal family. What conclusions do you draw relative to the activities of a family at that time? 4853
12. Describe family life in China. 1392
13. Contrast the home life of colonial times with home life in your community. 1545-1550
14. Who was John Howard Payne? For what is he famous? 5423-5424
15. What right had a father over his children in the time of the early Romans? 5369

16. May the state take a child away from its parents? Why? 5369
17. What is divorce? Why can marriage be dissolved only by legal authority? What are some causes for divorce? Why is divorce forbidden under the laws of the Roman Catholic Church? What state does not permit divorce? 1981
18. Read the accounts under *Character Training*, on pages 1304-1305. How might misfortune or sorrow in the home cultivate such virtues as love, sympathy, and unselfishness? Give illustrations.
19. What is the purpose of mothers' pensions? How can a mother obtain a pension? When was the first mothers'-pension law passed? 4685
20. What is a parent-teacher association? What is its purpose? Do you have one in your school? Ask your parents or your teacher about it. 5369-5370
21. What is the National Congress of Parents and Teachers? Tell its history. What work has it done? 5369-5370
22. What is the program of the National Congress of Parents and Teachers? 5370
23. What is the International Federation of Home and School? When was it organized? What is its purpose? 5370
24. On what day of the year is Mother's Day? When was the day first observed? 4684
25. Write an essay on "Mother's Day." For facts, see page 4684.
26. What is the purpose of teaching household arts in schools? 3262
27. Look up the meaning of *home* and *house*.
Do they mean the same? If not, what is the difference? The following statement frequently appears in real-estate advertisements: "Own Your Own Home." Is *home* used correctly? Explain.
28. Write a paragraph describing what you think should be the location and surroundings for an ideal home.
29. What can children do to make their homes ideal?
30. Study the picture entitled *Homes through the Ages*, 1447. Report your impressions.
31. After you have read all the references on this unit, write a paper of five to ten pages in length on the following subject: "The Family and the Home." Make an outline of your paper before you write.

Supplementary Enterprises

1. Indian Families and Tribes. 3409-3429
2. Home Life of Birds. 754
3. The Family Life of Ants (or any other insect or animal). 296-303
4. Mothers' Pensions. 4685
5. Home-Making as a Profession. 3205-3210
6. Organizations of Parents and Teachers. 5369-5370
7. How Animals Educate Their Young.
8. What I Owe to My Home.
9. My Ideal Home.
10. Comparison of City-Home Life with Country-Home Life.
11. School Training in Home Duties.
12. Home and Family Life in Different Countries.

UNIT THREE

The School and Education

Elements of the Unit

- A. How We Learn.
- B. Why We Need Schools.
- C. How Schools Are Supported and Controlled.
- D. Special Kinds of Schools.
- E. How to Get the Most Out of School.

References

Adult Education. 52-54
 All-Year Schools. 228-230
 Ambition. 244-246
 Child Labor. 1375-1376
 Coeducation. 1525-1526
 The School as a Community. 1588-1590
 Continuation Schools. 1645-1646
 The Story of Education. 2112-2118
 United States Office of Education. 2127-2128
 Education Week. 2131
 Habit. 2997-2998
 Habits in Childhood. 2998-2999

Harvard University. 3066-3068
 Illiteracy. 3363-3366
 Income Distribution. 3373-3374
 Instinct. 3467-3468
 Kindergarten. 3776-3791
 Memory. 4388-4389
 Moonlight Schools. 4643-4644
 Nursery Schools. 5117-5118
 Physical Education. 5587-5593
 The Story of Schools. 6417-6428
 School Garden. 6428-6429
 The Story of the University. 7414-7416

Questions, Problems, and Exercises

1. What is the meaning of *education*? How does it differ from *schooling*? 2112-2113
2. What is *instinct*? Is nest-building among birds an instinct? Is the migration of birds instinctive? 763-764, 3467-3468
3. Do instincts help us learn? Mention ways in which instincts are helpful. Are they ever harmful? Explain.

4. What is *habit*? Do we inherit habits? How are they formed? Is habit a good or bad thing? Discuss and give illustrations. 2997-2998
5. When do we acquire most of our habits? How early in life do we begin to form habits? 2998
6. Name some habits which you wish you had. Name some which you wish you could break. Name some things which you do now because of "force of habit." 2997
7. Through which sense do you remember most easily, visual or auditory? What is the best way to learn how to spell a word? 4389
8. What is memory? Upon what does a good memory depend? Which is more important, habit or memory? Give reasons for your answer. 2997, 4388-4389
9. Explain the following statement: "We learn through our own experiences and the experiences of others." List ten things which you have learned through your own experiences and ten which you have learned through the experiences of others.
10. Were the founders of our country interested in schools and education? 6417-6418
11. What are *public* schools? How are they supported? 6418-6420
12. What was the first high school in the United States? When was it established? 6419-6421
13. What were the *dame schools*? 6419
14. Were girls permitted to attend public schools during the colonial period? 6419
15. What is coeducation? Give the arguments for and against coeducation. 1525-1526
16. When may it be said that "universal" education began? 2117
17. How many school teachers are there in New York City? 4980
18. What percentage of the expenditures of the average family goes for education? Is this high or low? Discuss. 3373
19. What is the oldest university in the world? When was it founded? 2117
20. What is the difference between an endowed university and a state university? 7415
21. What is the oldest institution for higher education in America? When was it founded? 3066
22. To what extent does your school give attention to health inspection? 2115
23. What are the aims and objectives, from the point of view of boys and girls, of physical education? To what extent is your personal physical education program meeting the aims and objectives listed on page 5587?
24. How many of the *Simple Home Exercises in Physical Culture* (5590-5591) have you tried? Try each of them for a period of time, and note the effect.
25. To what extent is your school providing opportunity for the activities of physical education listed on pages 5588-5589?
26. What is a *part-time* school? What is its aim? What provisions are there in your community for part-time schools? What relation is there between child-labor laws and continuation schools? 1375-1376; 1645-1646
27. What is *adult education*? Make a survey of your community, and list all the opportunities which are offered for adult education. Is adult education a substitute for regular schooling? 52-54
28. What are *consolidated* schools? What are some advantages of such schools? 6423-6424
29. When, where, and for what purpose were all-year schools started? What are some advantages of the all-year school plan? Some disadvantages? 228-230
30. Is your school building used as a community center? Discuss the question. 1588-1590
31. What is the purpose of nursery schools? Why are they more necessary now than ever before? 5117
32. Read the article on *AMBITION*. What is the derivation of the word *ambition*? What did Quintillian mean when he said: "Though ambition in itself is a vice, yet it is often the parent of virtues"? What is the difference between *ambition* and *emulation*? 244-246
33. Write a paper on "My School Life." Tell (1) where you have gone to school, (2) what subjects you like, (3) what subjects are easy for you, (4) what subjects give you trouble, (5) how long you intend to stay in school, (6) school activities in which you engage, (7) in what respects you would like to improve yourself, (8) what you are preparing for, and (9) how your school life is helping you.

Supplementary Enterprises

1. Famous American Universities: Harvard, 3066-3068; Yale, 7924-7926; University of Chicago, 1366-1367; Princeton University, 5816-5817; Stanford University, 6801-6802; Johns Hopkins University, 3682; Columbia University, 1570-1571
2. Some Famous European Universities: Cambridge, 1103; Berlin, 716; Oxford, 5280-5281; Sorbonne, 6689-6690; Paris, 5381; Heidelberg, 3125-3126; Edinburgh, 2108; Dublin, 2045
3. The Story of the Library. 3967-3972, 3972-3974
4. Nursery Schools. 5117-5118
5. Physical Education. 5587-5593

6. How the Child Learns through His Senses. 1370-1372
7. The Story of the College and the University. 1537-1538, 7414-7417
8. The School as a Community. 1588-1590
9. Correspondence Schools. 1699
10. Rural Education. 6252-6254
11. Scholarships and Fellowships. 6415-6417
12. Moonlight Schools. 4643-4644
13. A Program for Education Week for the Local Community. 2131
14. Some Famous Educators: Horace Mann, 4267; Johann Heinrich Pestalozzi, 5513-5514; Friedrich Wilhelm Froebel, 2624; Henry Barnard, 624-625
15. Pupil-Government in Schools. 2753-2754

UNIT FOUR

The Church and Religion

Elements of the Unit

- A. What Religion Is.
- B. Great Religions of the World.
- C. The Christian Religion.
- D. What the Church Does for the Community.

Questions, Problems, and Exercises

- A. What Religion Is:

References:

- Ancestor Worship. 274
 Animal Worship. 292
 Animism. 292
 God. 2850-2851
 Indians (Indian Thought). 3403-3404
 Mythology. 4787-4800
 Religion. 6050-6051
 Sun Dance. 6925
 Totem. 7222-7223
 Transmigration of the Soul. 7244-7246

1. What does the term *god* mean? 2850
2. Among the heathen, are the gods necessarily better than man? Explain. 2850, 4787-4788
3. What was the Hebrew idea of God? 2850
4. What is the Christian conception of God? 2851
5. What is the meaning of religion? With what is religion concerned? What do we know about the origin of religion? 6050-6051
6. What is the meaning of *morality*? What is the difference between religion and morality? Was there any relation between religion and morality in primitive religions?
7. What is the difference between a *monotheistic* and a *polytheistic* religion? 6050
8. What is animism? 292, 6050
9. What is ancestor worship? How did it originate? What peoples worship their ancestors? 274, 6051
10. What is animal worship? How are animal worship and ancestor worship alike? How are they different? 274, 292, 7244-7246
11. What is a *totem*? 7222-7223
12. Describe the religion of the American Indian. 3403-3404, 6925

13. Read the story of mythology (4787-4800), and explain the relationship between mythology and religion.

- B. Great Religions of the World:

References:

- Bible. 723-732
 Brahma. 916-917
 Brahmanism. 917
 Buddhism. 999-1000
 Christianity. 1412-1413
 Confucius. 1605-1606
 India (Religion). 3380-3382
 Jews. 3672-3676
 Koran. 3813-3814
 Lamaism. 3846.
 Mohammed. 4567-4568
 The Book of Mormon. 4654
 Religions of the World. 6051
 Synagogue. 6984-6985
 Talmud. 7010
 Vedas. 7469-7470

1. Who was Mohammed? What people worship him? 4567-4568
2. What is Brahmanism? Who was Brahma? Discuss. 916-917
3. Who was Confucius? What peoples worship him? Discuss Confucianism. 1605-1606
4. Who was Buddha? Discuss Buddhism. 999-1000
5. What is the dominant religion in India? 3382
6. What is Judaism? Describe the Jewish Synagogue. 3672-3676, 6984-6985
7. Study the tables which give the distribution of followers of the great religions of the world. Were you surprised in any way? Explain. Which religion has the largest number of followers? Which has the next largest? 6051
8. Compare the following four books: Bible, 723-732; Koran, 3813-3814; Book of Mormon, 4654; and Talmud, 7010
9. What is the Vedas? 7469-7470
10. What is meant by the expression, "religions coextensive with life"? What great religions are coextensive with life? Which ones are not? Explain. 6050-6051

C. The Christian Religion:

References:

Apostles. 319-320

Apostles' Creed. 320

Bible. 723-732

Bible Society. 732

Christian Era. 1412

Christianity. 1412-1413

Creed. 1739

Decalogue. 1855

Federal Council of Churches of Christ in America. 2389

Greek Church. 2951-2952

America's First Brick Church. 3617

Jesus Christ. 3662-3671

Protestant. 5852

Reformation. 6037-6040

Religious Liberty. 6052-6053

Roman Catholic Church. 6164-6167

1. What is the Christian conception of God? 2850
2. What does the word *Christ* mean? 1412
3. Read the article on JESUS CHRIST. Tell briefly the story of His life and work. 3662-3671
4. What is meant by the word *creed*? What is usually contained in a church creed? 1739
5. What is the Apostles' Creed? What does it contain? 320
6. What is the Decalogue? 1855
7. What does the word *Protestant* mean? 5852
8. What was the Reformation? Who was its leader? What was the direct result of the movement? Tell briefly the story of the Reformation. 6037-6040
9. What is the Roman Catholic Church? 6164-6167
10. What is the Greek Orthodox Church? 2951-2952
11. Into what three great branches or factions are the believers in Christianity divided? 2951, 6037, 6164
12. Define *denomination*, *sect*. What is the difference?
13. If you are a member or are interested in a particular religious denomination or sect, read about it. The various denominations and sects are listed under *Related Subjects* for this unit.
14. How many copies of the Bible and of the New Testament are distributed each year? 724
15. What is the American Bible Society? When was it founded? What is its aim? How many copies of the Bible has it distributed? About how many copies does it distribute annually? 732
16. What do B.C. and A.D. mean? 3666
17. What is meant by "religious liberty"? Does the Constitution of the United

States provide for religious liberty? Is there complete religious liberty in the United States? 6052-6053

18. What is the Federal Council of Churches of Christ in America? 2389

D. What the Church Does for the Community:

References:

Charity. 1311-1312

Sisters of Charity. 1312

Knights of Columbus. 3805-3807

The Salvation Army. 6350

Sunday Schools. 6926

Volunteers of America. 7568

Young Men's Christian Association. 7952-

7954

Young Women's Christian Association.

7954-7955

1. How does the Church help the community? Would you like to live in a community in which there are no churches? Why?
2. Where did relief work of an organized character have its beginning? 1311
3. In what ways has religion promoted architecture, literature, art, and music? See list of religious pictures at the end of this unit. See also the first project under *Supplementary Enterprises*.
4. How has the Church aided education?
5. Do people who do not belong to a church derive benefits from the presence of churches in the community? Explain.
6. What is your own church doing to promote the social welfare of your community?
7. Who began the Sunday-School movement? When? In what country? 6926
8. What was the first Sunday School called? What was its purpose? What is the purpose of Sunday Schools to-day? 6926
9. What is the purpose of the Young Men's Christian Association? Where was it founded? When? By whom? 7952-7953
10. How large is the membership of the Y.M.C.A.? How wide-spread are its activities? 7953-7954
11. What is the Y.W.C.A.? Tell about its origin. When did it begin its work in the United States? What was its specific purpose? 7954-7955
12. Describe the origin, purpose, and activities of the Knights of Columbus. 3805-3807
13. How many churches are there in New York City? 4980. In Chicago? 1360

Supplementary Enterprises

1. Make a study of church architecture. The following references will prove helpful: 362-366, 1113, 1243-1246, 1488, 4380-4382, 4496-4497, 4674, 5093-5095, 6208, 6271, 6321, 6325-6327, 6984-6985, 6993-6994, 7092, 7715-7716

2. Some Great Religions of the World: Brahmanism, 916-917; Buddhism, 999-1000; Confucianism, 1605-1606; Mohammedanism, 4567-4571.
3. The Mormons. 4653-4656
4. Madonna and Her Babe as Subjects for Art. 4205-4208
5. Superstition as an Element in Early Religion. 6931-6938
6. Religion in India. 3380-3382
7. Mythology and Religion. 4787-4800
8. California's Old Missions. 1092-1094
9. Missions and Missionaries. 4533-4534
 - Saint Augustine. 502
 - Saint Boniface. 837
 - Jonathan Edwards. 2134-2135
 - John Eliot. 2209
 - Wilfred T. Grenfell. 2962-2963
 - Reginald Heber. 3120-3121
 - Louis Hennepin. 3141
 - David Livingstone. 4061-4062
 - Jacques Marquette. 4298-4299
 - Saint Patrick. 5416-5417
 - Saint Paul. 5419-5421
 - Marcus Whitman. 7752-7753
 - Francisco de Xavier. 7915
10. Some Great Religious Leaders:
 - John Calvin, 1100-1101
 - Desiderius Erasmus. 2284
 - John Huss. 3298
 - John Knox. 3809-3810
 - Martin Luther. 4158-4159
 - John Wycliffe. 7902-7903
 - Ulrich Zwingli. 7990
6. Colonial Religion. 1549-1550
7. Congregational Church. 1606
8. Fanny Crosby. 1755-1756
9. Disciples of Christ. 1956-1957
10. Episcopal Church. 2281
11. Eucharist. 2313
12. Gentiles. 2719-2720
13. The Gospels. 2877-2878
14. Jerusalem. 3658-3661
15. Jesuits, or Society of Jesus. 3661-3662
16. Latter Day Saints. 3889
17. Lord's Prayer. 4109-4110
18. Lutherans. 4158-4160
19. Methodists. 4422-4423
20. Moses. 4670-4674
21. Presbyterian Church. 5799-5801
22. Quakers, or Society of Friends. 5901-5902
23. Reformed Church. 6041
24. Synagogue. 6084-6085
25. Tabernacle. 6993-6994
26. Unitarians. 7360-7361
27. United Brethren in Christ. 7361
28. Universalists. 7414
29. Zoroaster. 7987

Religious Pictures

1. The Arrival of the Shepherds, 3663
2. The Good Shepherd, 3663
3. Finding Christ in the Temple, 3664
4. Casting Out the Money Changers, 3664
5. The Entry into Jerusalem, 3665
6. The Last Supper, 3665
7. Christ before Pilate, 3665
8. Christ Blessing Little Children, 3667
9. The Crucifixion, 3669
10. The Transfiguration, 3670
11. The Madonna, 4207
12. The Mount Where Moses Received the Law, 4673
13. The Worship of the Golden Calf, following page 5300.
14. Ruth and Naomi, 6283

Related Subjects

1. Adventists. 57-58
2. Baptists. 615-616
3. Church of the Brethren (Dunkers, Dunkards). 941
4. Christian Science. 1413-1414
5. Church of England. 1421

UNIT FIVE

Community Life

Elements of the Unit

- A. Our Relationship to the Community.
- B. Early Types of Communities.
- C. The Development of a Community.
- D. Rural Communities.
- E. The Modern City Community.
- F. Community Spirit and Neighborliness.

References

Amana. 240-241
 How Ants Live. 298-299
 Arabs. 341-343
 Bee (Life in the Hive). 675
 Borough. 869

Brook Farm. 975
 City. 1437-1438
 The Story of Civilization. 1444-1449
 Clan. 1453-1454
 Colonial Life in America. 1545-1550
 Community Interests. 1588-1590
 Gary, Indiana. 2697-2698
 Story of the American Indian. 3401-3429
 Nomad Life. 5039-5040
 Oneida Community. 5200

Questions, Problems, and Exercises

1. Membership in the family group, the school community, and the church are important, but it is perhaps equally important

- to be a member of the local community. Discuss the significance of membership in a community or neighborhood.
2. What is a community? A neighborhood? What is the difference? Do you belong to a neighborhood or a community? Explain.
 3. What is a clan? What is a tribe? What is the difference? When did the clan system have its beginning? Describe the life of the clan. 1453-1454
 4. Are clans and tribes forms of community life? Explain. How does a clan or tribe differ from a modern community?
 5. Do bees and ants live in communities? Are they similar to human communities? 298-299, 675
 6. What is *nomadism*? What is meant by *pastoral* life? Is there any difference between nomad life and pastoral life? 5039-5040
 7. Describe the community life of the Arabs. 341-343
 8. Did the American Indians live in communities? Explain. 3401-3429
 9. Describe the community life of an early New England town. Of a frontier community. Why did not towns spring up in the South as readily as in New England during the early colonial period? Was a plantation a community? Explain. 1546
 10. Describe briefly the way in which a city community develops. 1437
 11. Why was the present site of Pittsburgh chosen for a fort? 5637
 12. Why is the location of Chicago so favorable to rapid growth? 1362-1363
 13. Why did Gary, Ind., grow so rapidly as a community? Did the city "just naturally grow up"? Tell about the founding and growth of the city. 2697-2698
 14. Make a study of your own community. Find out all you can about it. Why was the site chosen? Give advantages and disadvantages of the location. What are the possibilities and probabilities of growth? Is it an industrial or a residential community? Explain.
 15. What is a borough? A village? A town? A hamlet? A city?
 16. What is the difference between a *rural* and an *urban* community? In which do you live?
 17. List in parallel columns the advantages and disadvantages of rural and urban community life.
 18. What is meant by the "submerged element" of a community? What should a community or neighborhood do for this element? 1588
 19. What is a Neighborhood Hall? Have you one in your neighborhood? If so, describe its work. 1588
 20. What are the chief arguments for using school buildings as community centers? 1588
 21. Is a school building necessarily being used as a community center simply because "something is going on in the building every evening"? Explain. 1588-1589
 22. Describe a Community Forum. What did former President Wilson say about forum programs? 1590
 23. Plan in detail a Community Forum for your community. Plan the details of the organization, draw up programs, and show how the Forum will help the community.
 24. Memorize the eight lines on *Neighborhood* found on page 1590.
 25. Describe the community life of Brook Farm, Oneida Community, and Amana. 975, 5200, 240-241
 26. In what ways are these communities alike? How different?

Supplementary Enterprises

1. The School in the Rural Community.
2. The Church in the Rural Community.
3. Community Life of the Clan and Tribe.
4. Colonial and Frontier Communities.
5. Problems of Rural Community Life.
6. My Community and How It Came To Be.
7. How I Can Help Improve My Neighborhood.
8. Community Spirit and Neighborliness.
9. Community Life among the Indians.
10. The Community Center.

Part Two. Community Welfare

UNIT SIX

The Community and Immigration

Elements of the Unit

- A. Why America Is Called "The Melting Pot."
- B. Our Changing Policy toward Immigration.
- C. Contributions of Immigrants to American Life.
- D. The Americanization Program.

Questions, Problems, and Exercises

- A. Why America Is Called "The Melting Pot."
- References:*
 Chicago (The People). 1351
 Emigration and Immigration. 2222-2225
 Gary, Indiana. 2697-2698

New York City. 4981-4982
 San Francisco (Foreign-Colonies). 6368-6370
 The People of the United States (Immigration). 7367-7368
 Israel Zangwill. 7969

1. Why is America called a "melting pot"?
2. Who wrote the play entitled *The Melting Pot*? Read it. 7969
3. What is an emigrant? An immigrant? 2222
4. What is the difference between the migration of peoples in ancient times and modern emigration? 2223
5. What other country besides the United States has been called a melting pot? 4239
6. How many immigrants came to the United States between 1790 and 1929? 2225
7. What percentage of the population of the United States is of foreign birth or parentage? What percentage of Chicago's population is foreign-born or of foreign parentage? What percentage is foreign-born? What percentage of New York City's population is foreign-born? 2225, 1351
8. How many different nationalities are represented in the population of New York City? 4982
9. What percentage of the male population in Detroit over twenty-one years of age is foreign-born? In Cleveland? In Chicago? In New York City? 2225-2226
10. What percentage of the population of Gary, Ind., is foreign-born? 2697
11. In what year did the greatest number of immigrants come to the United States? How many? 2225
12. What have been some of the causes for emigration and immigration? 2223, 7367
13. To what countries other than the United States has the flow of immigration been great? 2223

B. Our Changing Policy toward Immigration.

References:

Alien and Sedition Laws. 221
 Oriental Immigration. 1095-1097
 Chinese Exclusion. 1402-1403
 Emigration and Immigration. 2222-2227
 Know-Nothings. 3808-3809
 The People of the United States (Immigration). 7367-7368

1. Read carefully the entire article on EMIGRATION AND IMMIGRATION, 2222-2227
2. Has the United States ever officially encouraged immigration? 2225
3. How did immigration into the United States between 1840 and 1890 differ in

character from that between 1890 and 1920? 2223-2226, 7367-7368

4. What is the meaning of the terms *old* and *new* immigration? Explain fully. 2225
5. What was the Alien Act? What did it provide? 221
6. Who were the Know-Nothings? 3808-3809
7. When did the immigration of Chinese to the Pacific States begin to increase rapidly? 1402
8. When was the Chinese Exclusion Act passed? Why? 1095, 1402-1403
9. How is Japanese and Chinese immigration restricted? 1095-1097, 1402
10. What were the first restrictions placed upon immigration? 2226
11. Make a report to the class on the legislation restricting immigration since 1917. 2226-2227
12. Study the maps on page 2224. What conclusions do you draw relative to the immigration laws of 1917 and 1924?
13. What is the present policy of the United States toward immigration? Are you in sympathy with it? Why?
14. After you have read all the references in this section, write a paper of two to five pages in length on the following topic: "What I Think America's Policy Should Be toward Immigration."

C. Contributions of Immigrants to American Life.

References:

Louis Agassiz. 85
 Alexander Graham Bell. 703
 Edward Bok. 816
 Andrew Carnegie. 1202-1204
 John Ericsson. 2285-2286
 Albert Gallatin. 2666
 Stephen Girard. 2813
 Alexander Hamilton. 3025-3026
 James J. Hill. 3179
 Samuel Gompers. 3868
 S. S. McClure. 4173-4174
 A. A. Michelson. 4456-4457
 John Muir. 4732-4733
 Joseph Pulitzer. 5876-5877
 Jacob Riis. 6127
 Augustus Saint Gaudens. 6306-6307
 Carl Schurz. 6431
 Anna Howard Shaw. 6544
 Charles Proteus Steinmetz. 6823-6824

1. What is meant by the phrase, "Americans by adoption"?
2. From the list of famous naturalized Americans listed above, choose five and write a fifty-word paragraph about each. Emphasize the immigrant's contributions to American life and the interesting things about his life.

3. Prepare an oral report two to five minutes in length on one of the foreign-born citizens listed above. If possible, consult other sources. Emphasize the contribution of the individual to American life.
4. What were the chief contributions of the *old* immigrants? Of the *new* immigrants?
5. Give the contributions to American life of the following nationalities: English, German, Scandinavian, Russian, Irish, and Polish.
6. In what way have immigrants contributed to American literature, art, music, dress, and the culinary art?

D. The Americanization Program.

References:

Jane Addams. 35-36

Alien. 221

Americanization. 249

Citizen. 1435-1436

Ellis Island. 2214

Ghetto. 2797-2798

Hull House. 3280-3281

Naturalization. 4820-4822

Social Settlement. 6670-6671

1. What is a citizen? Who are citizens of the United States? Are you a citizen? 1435-1436
2. What is an alien? A foreigner? Are they the same? 221
3. What is naturalization? 4820
4. Is the theory of naturalization a modern development? 4820
5. Who may become naturalized citizens of the United States? Who may not? 4820-4821
6. Can a naturalized citizen become President of the United States? 4821
7. How long must an alien live in the United States before he may "declare his intention" of becoming a citizen? How long must he live there before he may get his "final papers"? Where may he apply for his papers? 4820-4821
8. What are some of the rights of naturalized citizens? 4821
9. How does the naturalization policy of some other countries differ from our own? 4822

10. Assume that a foreigner has written you asking for information as to how he may become a naturalized citizen. Write a letter to him, using a fictitious name, giving as complete information as you can concerning the steps he should take. Use proper letter form. Put the letter in an envelope, address it, and hand it to your teacher.
11. What does Americanization mean? Explain fully. 249
12. Explain the difference between naturalization and Americanization. 4820, 249
13. Who are likely to become Americanized more easily and rapidly, children or adults? Why? 249
14. Do immigrants from Southern and Eastern Europe become Americanized as easily as those from Northern and Western Europe? Explain.
15. What is perhaps the greatest factor in Americanization? 249
16. What agencies in the community are effective means of Americanizing immigrants? Discuss fully. 249
17. How can you, as a native American or as a naturalized American, help to Americanize immigrants? What can you do to help foreigners to understand American ideals of citizenship?
18. What is meant by the word "ghetto"? Have you ever visited one? If so, describe it. Read, if you can, *Children of the Ghetto*, by Zangwill. 2797-2798
19. Make a report on Jane Addams and her work. 35-36; 3280-3281

Supplementary Enterprises

1. Queer Customs in My Ancestors' Native Land.
2. Family Heirlooms Brought across the Sea.
3. Ellis Island.
4. Oriental Immigration.
5. Chicago as a "Melting Pot."
6. New York as a "Melting Pot."
7. The Migration of Peoples.
8. Contributions of Immigrants to American Life.
9. Immigration Legislation throughout America's History.
10. The Americanization Program.

UNIT SEVEN

The Community and Health

Elements of the Unit

- A. Importance of Good Health to the Individual and to the Community.
- B. What the Community Does to Safeguard Health.

- C. Sacrifices and Contributions of Noted Individuals to Public Health.
- D. How the Individual Can Coöperate.

Questions, Problems, and Exercises

- A. Importance of Good Health to the Individual and to the Community.

References:

Aesculapius. 68-69

Health. 3104

Hygeia. 3312

Hygiene. 3312-3314

1. Memorize the four lines from the English poet, John Gay. 3104
 2. What is health? Who may be said to be a healthy person? Do many people enjoy perfect health? 3104
 3. What did ancient people regard as the symbol of health? 69
 4. What is *hygiene*? How does hygiene differ from the practice of medicine and surgery? Which is the more important? In this connection discuss the proverb, "An ounce of prevention is worth a pound of cure." 3312
 5. Into what four main branches may hygiene be divided? What is your relation to each? 3312-3314
 6. Someone has said "On every side, the world over, we are confronted by the fact that health, including normal physical development, longevity, and good bodily resistance is being only very inadequately achieved by millions of people." Why do people neglect their health? 3123
 7. According to Professor Fisher of Yale University, what is the annual financial loss caused by preventable diseases? 3104
 8. What importance does Dr. McBride attach to a strong physical body? 3105-3106
 9. Do you pay more for the things you buy because some people in your community are ill? Explain.
 10. Explain and give illustrations to prove this statement: "Public health is public wealth."
 11. What economic advantages are there in living in a healthy community? Explain.
- B. What the Community Does to Safeguard Health.

References:

Adulteration of Foodstuffs and Clothing. 54-56

Aqueduct. 335-338

Bill of Health. 739

Board of Health. 808

Chicago Drainage Canal. 1367-1368

Epidemic. 2279

Hygiene. 3312-3314

Pure-Food Laws. 5884

Quarantine. 5903-5904

Sanitary Science. 6374-6375

Sewage and Sewerage. 6511-6514

Vital Statistics. 7548-7549

Waterworks. 7676-7680

of community protection? 739

2. What is meant by *public hygiene*? With what is it primarily concerned? 3313-3314
3. What is an *epidemic*? An *endemic*? A *pandemic*? Name some diseases that are epidemic in character. 2279
4. What is sanitary science? What is its purpose? 6374-6375
5. What is a board of health? What are the duties of a city board of health? Of a state board of health? Is there a national board of health in the United States? 808, 3314
6. Are there any national agencies which deal with problems of public health? If so, name and describe them. 808
7. What is quarantine? What does the word mean? Discuss the different kinds of quarantine. Why should a person who is not ill be willing to submit to quarantine if he has been exposed to disease? 5903
8. What is meant by vital statistics? Is the keeping of such records an important community service? Why? 7548-7549
9. State briefly what is meant by food adulteration. How does the government protect us from impure or adulterated food? List all the ways mentioned in the article on ADULTERATION OF FOODSTUFFS in which food is safeguarded by law. 54-56
10. When is food said to be adulterated? Misbranded? Which is more harmful? Why? 5844
11. What is the purpose of pure-food laws? 5884
12. When did Congress adopt the Federal Food and Drugs Act? When did the act go into effect? Who enforces pure-food laws? 5884
13. Tell about the construction of the Chicago Drainage Canal. Why was it constructed? What did it cost? How long is it? What is one of the most significant facts about it? 1367-1368
14. Why are communities willing to spend millions of dollars in the construction of aqueducts? How does New York City get its water supply? San Francisco? How much has New York City spent on aqueducts and dams merely to provide a pure water supply? 336, 4994, 6371
15. What is the longest aqueduct in the world? How long is it? What did it cost? 336-337
16. How much water does New York City use daily? Chicago? 1360, 4980
17. Rule a sheet of paper into seven columns and head each one with one of the following community responsibilities: (1) supplying pure water, (2) protecting the air we breathe, (3) protecting our food

1. What is a "bill of health"? Is it a means

supply, (4) preventing the spread of contagious diseases, (5) providing healthful working conditions, (6) providing opportunity for exercise, and (7) protecting our clothing and bedding. Then list in each column the things which the community does to provide each of the seven good health factors.

C. Sacrifices and Contributions of Noted Individuals to Public Health.

References:

William Crawford Gorgas. 2875
Sir Wilfred Grenfell. 2962-2963
Edward Jenner. 3655
Joseph Lister. 4045
Louis Pasteur. 5411-5412

1. Who was Gorgas? For what great achievement is he given credit? Tell about his work. 2875, 5332, 4678, 7932-7933
2. What contribution to human welfare was made by Louis Pasteur? 5411
3. Who was Sir Joseph Lister? For what is he famous? 4045
4. Write a paragraph about each of the men listed above. Tell about their significant contributions. Consult, if you can, other sources.

D. How the Individual Can Coöperate.

References:

Diet. 1944
First Aid to the Injured. 2436-2439
Food. 2508-2513
Health Habits. 3104-3106
Personal Hygiene. 3312-3313
Length of Life. 3978-3980
Life Extension. 3980-3992
Nutrition. 5121-5126
Sleep. 6641

1. What is the first essential to hygienic living? Is this your personal responsibility? Explain. 3312
2. Discuss the four factors of good health—food, clothing, exercise, and personal cleanliness. What control do you have over these factors? 3312-3313
3. Name five essential health habits. Has the community made it possible for you to form these habits? Explain. 3104-3106
4. What are some important factors to be observed concerning our food? 3104-3105
5. What effect does insufficient sleep have upon our bodies? How much sleep does an adult need? Children from six to ten years? Older children? 3105, 6641
6. Is there any relation between mental habits and health habits? Explain. 3105
7. Does becoming angry or hating someone affect your health? 3105

8. If your health is impaired through anger, fear, worry, grief, or hatred, who is at fault, you or the community? Explain.
9. Does one derive from exercise any benefits other than physical? 3105
10. Read and study carefully the fifteen simple rules for hygienic living found on pages 3982-3991. How many are you following now? Which ones have you neglected? Can you neglect any of them without being a poor citizen? Explain. Read carefully the *Summary* on pages 3991-3992
11. Read the articles on NUTRITION (5121-5126), Food (2508-2513), and DIET (1944)
12. Is flying dust a disease carrier? Explain. How may you as an individual coöperate in reducing the amount of dust in the air? 2059-2060
13. Tell in class the story of Luigi Cornaro's life. 3980
14. What is the meaning of *longevity*? How long do some trees live? How many years may a whale be expected to live? An eagle? A pike? A horse? An elephant? A man? Why is the span of life of man so short as compared with some animals? Do you think the span of life of man will ever reach 200 years? Give reasons for your answer. 3978-3980
15. What countries have a high death rate? Which ones have a low rate? What accounts for the difference? 7549

Supplementary Enterprises

1. The Story of Meat Packing with Special Emphasis upon Health Factors. 4360-4368
2. The Story of Medicine and Drugs. 4374-4377
3. The Pasteurization of Milk and Its Important Relation to Health. 4481-4484, 5411, 5412
4. The Mosquito and Its Relation to Health. 4674-4679, 3463, 5332, 2279, 4236-4237, 3314
5. Supplying a City with Pure Water. 335-338, 1360-1362, 2419, 3305-3306, 4439, 6065, 7676-7680
6. Medical Inspection in Schools. 6425
7. The Story of Baths and Bathing. 648-651
8. The Fly, the Deadly Enemy of Man. 2498-2503, 3463
9. Local and International Quarantine. 5903-5904
10. The Story of the Red Cross. 6025-6031, 7881
11. Sewage and Garbage Disposal in Large Cities. 6511-6514
12. The Smoke Nuisance and Health. 6654
13. Some Well-Known Life Savers: Edward

- Jenner, 3655; Joseph Lister, 4045; William Crawford Gorgas, 2875; Sir Wilfred Grenfell, 2962-2963; Louis Pasteur, 5411-5412
14. Great Plagues and Epidemics in History. 5641, 2279
 15. Private Health Agencies Which Promote Health in My Community
 16. How My Community Safeguards My Health
 17. How Yellow Fever Was Conquered. 7932-7933, 2875, 5332, 4674, 4679

UNIT EIGHT

The Community and Protection

Elements of the Unit

- A. Why We Need Protection.
- B. Losses from Fire, Accidents, Crime, Natural Disasters, and Fraud.
- C. What the Community Does to Protect Life and Property.
- D. What the Individual Can Do.

Questions, Problems, and Exercises

- A. Why We Need Protection.

References:

Accident Prevention. 15-16

Counterfeiting. 1720-1721

Crime. 1745-1746

Fraud. 2600

1. What is one of the strongest human instincts? 15
2. List four dangers to life in primitive times.
3. List four dangers to life and property which the early colonists in America had to face.
4. List six dangers to life and property to-day which the colonists never had to face.
5. Is the problem of protection of life and property an increasingly serious one? Explain.
6. Do animals protect their young? If so, give examples.
7. What is crime? 1745
8. What is meant by criminal intent? 1746
9. What is meant by the word *fraud*? What is the difference between *actual* and *constructive* fraud? 2600
10. What does *counterfeiting* mean? 1720
11. Is it a crime to paint on a billboard an enlarged likeness of any coin or paper money? 1720
12. What is the penalty for counterfeiting or passing counterfeit money? 1721
13. Is counterfeiting an offense against the state or against the nation? 1721
14. Make a list of all the dangers to life and property which you know.
- B. Losses from Fire, Accidents, Crime, Natural Disasters, and Fraud.

References:

Accident Prevention. 15-16

Boll Weevil. 823-825

Corn Borer. 1691-1692

Earthquake. 2084-2086

Fire Losses. 2427-2428

Floods. 2471-2472, 4547-4548

Destroyers of the Forests. 2534-2536

Insects as Enemies of Man. 3462-3463

Lightning. 4001-4004

Volcanoes. 7560-7564

Waterspout. 7674-7675

1. What is the value of property destroyed annually by fire? 2426-2428
2. Compare the fire losses in the United States with those in Europe. 2428
3. Why are the losses greater in the United States? 2428
4. What are the annual losses from forest fires? 2534
5. About how many people are killed annually in automobile accidents? 15
6. What are the losses from the ravages of forest insects? 2536
7. What is the estimated money loss caused every year by insects? What would be the total for the United States? What are some of the most harmful insects? Where do they come from? Why are foreign insects sometimes relatively harmless in their native lands but very devastating in America? 3462-3463
8. What is a waterspout? Does it cause damage to life and property? 7674-7675
9. What was the greatest flood in the history of the United States? What losses were suffered? 2471
10. To what extent do volcanoes and earthquakes cause loss of life and property? 2084-2086, 7560-7564

- C. What the Community Does to Protect Life and Property.

References:

Accident Prevention. 15-16

The War in the Air. 127-129

The Story of the Army. 412-417

Fire Department. 2429-2433

Marine Corps. 4292-4293

National Safety Council. 4819

Navy. 4842-4851

Police. 5701-5702

Quarantine of Plants and Animals. 5904

Secret Service. 6477-6478

Weather Bureau. 7686-7692

1. What is the National Safety Council? What is its object? 4819
2. When did the Secret Service come into existence in the United States? 6477
3. What are the duties of the Secret Service? 6478
4. What were some activities of the United States Secret Service during the World War? 6478
5. Read about the police (5701-5702) and answer the following questions:
 - a. What popular name is usually given to the London police?
 - b. How is the police force organized in the United States?
 - c. What is the difference in the organization of the police force in European countries and in the United States?
 - d. What is the title of the executive head of the police department of your city?
 - e. What are the duties of the police? How do the duties now differ from those in early American history?
 - f. How many police are there in Chicago? In New York City? 1351, 4980
 - g. Why has it been necessary to organize state police?
 - h. Which state was one of the first to maintain a state police force?
6. Read the article on the Fire Department (2429-2433) and answer the following questions:
 - a. What were the fire departments called in the early days in America? Describe such a force.
 - b. When was the first successful steam fire engine used? In what city?
 - c. What are automatic sprinklers?
 - d. Does the law require factories and public buildings to be provided with adequate fire escapes?
 - e. How is a fire alarm given?
 - f. How many firemen are there in New York City? 4980
7. What do the Federal and state governments do to check losses from insects? 3463, 5904
8. How much did Congress appropriate for a campaign against the corn borer? 1691
9. What are the public schools doing to reduce the number of accidents? 15-16
10. What provision does the national government make for protecting life and property in the event of war? 127-129, 412-417, 4292-4293, 4842-4851

D. What the Individual Can Do.

References:

Fire Losses. 2426-2428
 Common Precautions against Fire. 2427
 How to Avoid Being Struck by Lightning. 4003

1. What can you as an individual do to prevent fire losses? 2428
2. From the list of the most important sources of destructive fires on page 2428, what do you conclude as to the ability of the individual to reduce fire losses?
3. What percentage of fires is due to preventable causes? What are your conclusions concerning the individual's responsibility? 2428
4. What should one do to protect himself against lightning? Study the pictures on page 4003.
5. Do you engage in any of the activities listed on page 16 which the National Safety Council has designated as careless actions? If so, which ones?
6. Make a list of all the things which you as an individual can do to prevent losses from fire and accidents.

Supplementary Enterprises

1. The Story of the Army. 412-417, 1621-1622, 4475-4480, 6597-6601, 7239-7240, 7567-7568
2. The Navy. 4835-4839, 4842-4852
3. The Coast Guard. 1509-1514
4. The Secret Service. 6477-6478
5. The Royal Canadian Mounted Police. 6219-6221
6. Finger-Print Identification. 720, 2420-2421
7. Protection against Natural Disasters: Floods, 2471-2472, 4547-4548; Lightning, 4001-4004; Lighthouse, 3998-4001; Tornadoes, 7212-7213; The Corn Borer, 1691-1692; The Boll Weevil, 823-825; Typhoon, 7341; Earthquake, 2084-2086, 3628, 3637; Insects as Enemies of Man, 3462-3463; Volcanoes, 7560-7564.
8. Crime and Criminology. 1745-1748
9. The Trade-Mark as a Means of Protection. 7233-7235
10. The Four-Footed Police. 5702
11. Carrier Pigeons and Protection. 1216-1217
12. Weights and Measures. 7702
13. Dangers That Most Often Threaten the Safety of Life and Property.
14. The History of Police Organization in America.
15. Fire Protection in Colonial America.
16. Rural Police Protection.

UNIT NINE

The Community and Recreation

Elements of the Unit

- A. Why We Need Play and More Play Facilities.
- B. The Value of Play and Recreation.
- C. What the Community Does to Provide Play and Recreation Facilities.
- D. Play and Recreation Facilities Provided by Private and Semi-Public Agencies.

Questions, Problems, and Exercises

- A. Why We Need Play and More Play Facilities.

References:

Amusements. 269

Child Labor. 1375-1376

Eight-Hour Day. 2156-2157

The Story of Play. 5655-5657

1. What does the word *play* mean? In what different ways is the word used? 5655-5656
2. Define the following words: Recreation, amusement, fun, work, labor, play, enjoyment, sport. Consult a dictionary.
3. Is play instinctive? 5656
4. Is play found in all climates and countries?
5. Why do children play? 5656
6. Why do adults play? 5656
7. What is the difference between the play of children and the play of adults? 5656
8. Why do we all need play? 269
9. State and explain the four theories about play given on page 5656.
10. Do all animals play? Do insects play? Describe the play of some animal.
11. Is factory labor more tiresome than the work of a craftsman? Explain.
12. Is change of work in itself recreation? Explain.
13. In what way does the eight-hour day and the five-day week create a demand for more play facilities?
14. Can you see any way in which child-labor laws have affected the problem of providing adequate facilities for recreation? Explain.
15. In general, vacation periods for employees are longer now than ever before. In what way does this affect the community's problem of providing opportunities for play?
16. What other changes in modern life create an increasingly greater demand for play and recreation facilities?

- B. The Value of Play and Recreation.

References:

The Story of Athletics. 484-487

The Story of Games and Play. 2674-2679

Educational Value of Moving Pictures.

4722-4724

The Story of Play. 5655-5657

Stamp-Collecting. 5770-5771

1. Has play always been looked upon with favor? Explain. 2674
2. What was the attitude toward play among the early Greeks? What games did they play? 2679
3. What are some values of play? 2674, 5656
4. What is the educational value of moving pictures? 4722
5. What are the benefits of athletics? 484-486
6. What are the advantages and disadvantages of high-school athletics? 485-486
7. What value could come to a selfish boy from playing such competitive team games as baseball, football, or basketball?
8. What are some educational values to be derived from the hobby of stamp collecting? Of any good hobby? 5770
9. Debate: *Resolved*, That competitive athletic games, such as baseball, football, and tennis, are more valuable to the individual than competitive mental games, such as chess and checkers.
10. What are some characteristics of good games? 2675
11. Write a paper of two to five pages on the following subject: "The Physical, Educational, and Social Value of Play."

- C. What the Community Does to Provide Play and Recreation Facilities.

References:

Boston (Parks). 872-873

Chicago (Playgrounds and Beaches). 1360

Chicago (The Park System). 1359-1360

Colonial Life in America (Their Amusements). 1549

Indians (Amusements). 3406

New York City (Parks). 4986

The Story of National Parks. 5383-5391

The Story of Play. 5655-5657

1. What were the amusements of the New England colonists? 1549
2. How did the American Indian spend his leisure time? 3406
3. Who should assume responsibility for providing play facilities for children? Discuss. 5657
4. What is regarded as the national game of Canada? Of the United States? Of England? 484, 3835

5. What is the distinction between "amateur" and "professional" athletics? 484
 6. What is the total area in acres of the Chicago parks? 1359
 7. What provision has Chicago made for play and recreation? 1360, 2868
 8. How many parks are there in New York City? 4980
 9. Which city has the oldest public park in America? What is the name of the park? 872
 10. Why have the national parks been called "the great summer playgrounds" of the country? Is it the essential purpose of the national government to maintain national parks as places for recreation? 5383
 11. What is your community doing to provide play and recreation facilities for both young and old?
 12. Should a community provide a year-round recreation program? Why?
 13. Plan a year-round recreation program for your community.
- D. Play and Recreation Facilities Provided by Private and Semi-Public Agencies.

References:

The Story of Boy Scouts. 909-914
 Camp Fire Girls. 1114-1115
 The Story of Girl Scouts. 2814-2817
 Hull House. 3280-3281
 Social Settlement. 6670-6671
 Young Men's Christian Association. 7952-7954
 Young Women's Christian Association. 7954-7955

1. What is the aim of the Girl Scouts' organization? 2814
2. Who may join the Girl Scouts? 2814
3. When were the Girl Scouts organized? 2814
4. What is the form of organization of the Girl Scouts? 2814
5. What are the qualities which the Girl Scout

organization aims to develop in girls? 2817

6. Compare the Camp Fire Girls and the Girl Scouts from the following points of view: Aim and purpose, history, size of organization, qualifications for membership, ideals, and value to the girl. 1114-1115, 2814-2817
7. Compare the Scout Law for boys (913) with the Scout Law for girls (2817). Are they exactly alike? How do they differ?
8. What recreation facilities are provided at Hull House? For whom? Is Hull House a private or public institution? Explain.
9. What is a social settlement? What recreational activities are usually carried on there?
10. Does your church provide opportunities for recreation? If so, describe them.
11. Are there any athletic clubs in your community? Any private golf courses?
12. Make a list of all the facilities for recreation in your community which are provided by private or semi-public agencies.

Supplementary Enterprises

1. The Olympian Games. 5196-5197
2. The Story of the Girl Scouts. 2814-2817
3. The Story of the Boy Scouts. 909-914
4. The Camp Fire Girls. 1114-1115
5. The Story of Moving Pictures. 4703-4729
6. The Story of Golf. 2864-2868
7. The History of Tennis. 7103-7105
8. The Story of Athletics. 484-487
9. The Story of Baseball. 633-639
10. The History of Basketball. 639-641
11. The Circus as a Form of Amusement. 1434-1435
12. The Story of Football. 2522-2528
13. Stamp Collecting as a Hobby. 5770-5771
14. Facilities for Recreation in My Community.
15. An Ideal Year-Round Recreation Program.
16. The Play of Animals.
17. Play in Colonial Times.
18. Play among Primitive Peoples.

UNIT TEN

Civic Beauty and City Planning

Elements of the Unit

- A. The Appeal of Beauty.
- B. City Planning in Ancient Times.
- C. City Planning in Europe.
- D. Well-Planned Cities in America.
- E. Regional and Larger Community Planning.

References

Outdoor Advertising. 61-62
 Athens. 480-483
 Canberra, Australia. 517, 1163

Babylon. 560
 The Story of Chicago. 1350-1366
 City Planning. 1440-1441
 Gary, Indiana. 2697-2698
 Interior Decoration (first paragraph). 3478-3479
 Paris. 5372-5380
 Philadelphia. 5540-5541
 Pittsburgh. 5634-5638
 Rome. 6170-6181
 The Story of Washington, D. C. 7636-7644

Questions, Problems, and Exercises

1. What is *beauty*? What is *civic* beauty?
2. Is the love of beauty instinctive? Give reasons for your answer. 3479
3. Did prehistoric man seek beauty and adornment? How do we know? 3478-3479
4. What is the purpose of city planning? 1440
5. Were the cities of Rome, Athens, and Babylon built according to a plan? 6170-6181, 480-483, 560
6. Is Paris a "planned" city? 5372-5380
7. What city in the Orient has recently begun to build according to a plan? 1440
8. Who made the plan for our national capital? 1440, 7636
9. What other men helped to plan the city of Washington? 1440; 7636
10. Who made the plan for Australia's new capital? Why was Canberra sometimes called the "bush capital"? In what ways are Canberra and Washington, D. C., alike? 517, 1164, 1440
11. What is the National Capital Park and Planning Commission? 7636
12. Read *The Story of Chicago* (1350-1366), and list the things which Chicago has done to make the city beautiful.
13. Tell about the founding and growth of Gary, Ind. Was it a planned city? 2697-2698
14. Describe the city plans of Cleveland, Ohio. 1475-1476
15. Who was one of the original city-planners of Philadelphia? Is Philadelphia a well-planned city? 5540-5541
16. Tell about the efforts to make Pittsburgh a beautiful city. 5635-5636
17. Is your city built according to a plan? If so, describe it.
18. What is meant by city zoning? 1440
19. What are some provisions of zoning ordinances? 1440
20. What is a "garden city"? Describe, in detail, a model garden city. Are there any garden cities now in existence? 1440-1441
21. How may beauty and utility be combined? For illustrations, see pages 153, 367, 1355, 1357. Are beauty and utility necessarily antagonistic? Explain.
22. Turn to pages 335, 1350, 1359, 7640, 7641 for illustrations of civic beauty.
23. What objections are there to billboard advertising? What is being done to offset them? 61
24. Is there any relation between economic prosperity and desire for beauty? Explain.
25. How does beauty add to the joy of living?

Supplementary Enterprises

1. Our Heritage of Beauty.
2. The Story of Architecture. 359-368
3. The Story of Athens. 480-483
4. Great City Planners and Landscape Architects: Daniel Hudson Burnham, 1033; Frederick Law Olmsted, 5194
5. Our National Capital, A Planned City. 7636-7644
6. A Spot of Beauty—The Singing Tower. 6619-6621
7. The Story of National Parks. 5383-5391
8. The Appeal of Beauty.
9. What I Can Do To Make My Community Beautiful.
10. The Billboard Nuisance.
11. City Planning in Ancient Times.
12. City Planning in Europe.

UNIT ELEVEN

The Care and Training of the Handicapped

Elements of the Unit

- A. The Blind and the Deaf.
- B. The Mentally Handicapped.
- C. Crime and the Criminal.
- D. Social Welfare Work.

Questions, Problems, and Exercises

- A. The Blind and the Deaf.

References:

Alexander Graham Bell. 703
 Education for the Blind. 792-794
 Laura Dewey Bridgman. 955
 The Education of Deaf-Mutes. 1847-1849
 Helen Adams Keller. 3751
 Special-Type Schools and Classes. 6424-6425
 Sign Language. 6601

1. Were there any attempts to educate the blind a century and a half ago? Discuss. 792
2. When was the first school for blind youth opened? By whom? In what country? 792
3. What is the essential difference between the schools for blind in Europe and in America? 792
4. Along what three lines has education for the blind been developed? 792-793
5. What three cities have been pioneers in providing schools for the blind? 793
6. What is a recent development in the education of blind adults? 793
7. What is *braille*? Study the braille alphabet on page 791. What is one of the chief advantages of the braille system? 793

8. Is it possible for a blind person to learn to write? Explain. 793
9. Are there any magazines published in braille? 794
10. How is geography taught to the blind? 793
11. How is natural history taught to blind children? 793
12. Into what occupations do blind children who have had schooling usually go? 792-793
13. Is the number of pupils in schools for the blind increasing? Explain. 794
14. Who was Laura Dewey Bridgman? Tell of her achievements. 955
15. Who is Helen Keller? Tell of some of her achievements. 3751
16. What are deaf-mutes? 1846
17. What treatment did deaf-mutes receive among the Greeks and Romans and in France in early history? 1847
18. Who was probably the first person to have compassion on deaf-mutes? 1847
19. Who was probably the first person to attempt education for the deaf? When? 1847
20. Did the Greeks and Romans recognize that deaf-mutes were normal in intelligence? 1847
21. When was the first school for deaf-mutes established? Where? Who founded it? 1847
22. What state led the way for the instruction of the deaf? In what year? 1847
23. How generally is education for deaf-mutes provided to-day? 1847-1848
24. Is lip-reading for the deaf being carried on successfully? 1848
25. What two general methods of instruction are used in carrying on education for the deaf and dumb? Describe them. 1848-1849
26. What famous deaf-mute has strikingly shown what can be accomplished through education for deaf-mutes? 3751
27. What great American inventor and scientist was interested and active in teaching deaf-mutes to talk? 703

B. The Mentally Handicapped.

References:

Asylum. 478
 Feeble-Minded. 2391
 Idiot. 3345
 Insanity. 3458
 Mental Handicaps. 4397-4399
 Special-Type Schools and Classes. 6424-6425

1. How were mental defectives treated in former times?
2. Why must special attention be given to school children who are slightly deficient mentally? 4397

3. Why do children frequently fail in some school subjects and do very well in others? 4397
4. If a child has difficulty in a single subject, should he be classed as mentally deficient? Explain. 4397
5. Do pupils show mental handicaps because of physical disorders? Explain. 4398
6. What kind of education is best for the slow children? Explain this statement: "A dull lawyer might make a very superior carpenter, or a slow teacher a very excellent mechanic." 4398
7. From a legal point of view, who may be referred to as the insane? 3458
8. Is *insanity* a medical term or a legal concept? 3458
9. Into what three classes are feeble-minded persons usually divided? 2391
10. What kind of education can be given to the majority of feeble-minded pupils? 2391
11. What is meant by the word *idiot*? Can idiots profit from education? Are they accountable for their acts? Why? 3345
12. Distinguish between the following terms: Feeble-minded, moron, imbecile, idiot, insane.
13. Is it important that the community care for the mentally handicapped? Why?

C. Crime and the Criminal.

References:

Avenger of Blood. 800
 Capital Punishment. 1185-1186
 Cities of Refuge. 1435
 Convict Labor. 1647
 Crime. 1745-1746
 Criminology. 1747-1748
 Felony. 2393
 Juvenile Court. 3725-3726
 Juvenile Delinquency. 3726-3728
 Cesare Lombroso. 4091
 Manslaughter. 4269
 Misdemeanor. 4533
 Morals Court. 4648
 Parole. 5398
 Pillory. 5616
 The Story of Prisons. 5824-5827
 Reform Schools. 6041
 Stocks. 6840
 Vendetta. 7476
 Whipping Post. 7741, 1745

1. What is crime? What is meant by criminal intent? 1745-1746
2. May an act which is harmless in itself be a crime? Explain.
3. May an act which is not a crime to-day be a crime to-morrow? Is crime the same in all countries? Explain.
4. Define the following terms: Felony, misdemeanor, manslaughter. 1746, 2993, 4533, 4269

5. What is the difference between civil law and criminal law? 1746
6. What is criminology? Give a full definition. 1747
7. What is regarded as "the mother of crime"? Explain. What are some other causes of crime? 1747
8. What is the meaning of the phrase *avenger of blood*? Who assumed responsibility for punishing criminals in primitive societies? 800
9. What were the "cities of refuge"? 1435
10. What is meant by vendetta? 7476
11. Describe the instruments for punishment known as whipping post, pillory, and stocks. 1745, 5616, 6840, 7741
12. Describe the prisons of a few centuries ago. If possible, read Byron's *Prisoner of Chillon*. 1382, 5824
13. What was the old attitude toward criminals? Contrast that with the attitude of to-day. 1748, 5824-5826
14. What is the difference between a prison and a jail? 5824
15. Describe briefly the history of prison reform. 5826-5827
16. Who has direct charge of a state prison? 5824
17. Is the work of the prison chaplain important? Explain. 5825
18. What is the tendency of present-day legislation with respect to the treatment of criminals? 1746
19. Who was Lombroso? For what is he noted? 4091
20. What does parole (in criminal law) mean? What is an indeterminate sentence? 5398, 3377
21. What is meant by convict labor? Describe two types of convict labor. 1647
22. What is capital punishment? 1185
23. What is a morals court? 4648
24. What is juvenile delinquency? Is it a new problem? 3726
25. Is a delinquent child a criminal? Up to what age may children be classed as delinquents? 3726
26. Is wrongdoing instinctive in children? Why do some of them violate the law? 3725
27. What is society's responsibility when a child violates the law? 3725
28. What are some of the causes of juvenile delinquency? What is the modern attitude toward juvenile delinquents? Is juvenile delinquency increasing? Why? 3726-3727
29. What is a juvenile court? When was it originated? What country established the first juvenile court? When was the first one established in the United States? In what city? 3725-3726
30. Is the juvenile court an American contri-

- bution to social progress? What city is noted for its juvenile court? Who is a famous juvenile court judge? 3726
31. What is a reform school? Why are they sometimes called industrial schools? Are they usually located in the city? Why? 6041
32. What efforts are being made in many communities toward the treatment and prevention of juvenile delinquency? 3727-3728

D. Social Welfare Work.

References:

Jane Addams. 35-36

Charity. 1311-1312

Sisters of Charity. 1312

Hull House. 3280

Social Settlement. 6670-6671

Applied Sociology. 6671-6673

1. Memorize the four lines from the poet Pope on *Charity*. 1311
2. Why have the expressions *welfare* and *social work* been substituted, in many instances, for *charity* and *relief*? 1311
3. When did relief work of an organized character begin? 1311
4. What is meant by regulated charity? 1311
5. One of the first welfare societies was started in London in 1869. Its main object was "cure, as distinguished from the mere alleviation of distress." Explain that statement.
6. Describe the way in which modern charitable organizations do their work. 1311, 6672-6673
7. Why is social work becoming recognized as a profession? 1311-1312
8. The National Conference of Charities and Correction in the United States has changed its title to the Conference of Social Work. Is this change significant? Explain. 6672-6673
9. What is a social settlement? What activities does it carry on? 6670
10. When was the first social settlement founded? Where? By whom? What is it called? 6670
11. Who is Jane Addams? Tell about her work. 35-36
12. What is Hull House? Describe its work. 3280

Supplementary Enterprises

1. Primitive Methods Employed in Punishing Criminals. 800, 6840, 7476, 7741, 1745, 5824-5827
2. The Education of Deaf-Mutes. 1837-1839
3. Modern Methods of Educating the Blind. 703, 792-794
4. The Care and Training of the Crippled

- and the Disabled.
5. Social Welfare Work. 35-36, 1311-1312, 3280, 6670-6673
 6. Juvenile Delinquency and Juvenile Courts. 3725-3728
 7. The Handicaps and Achievements of Helen Keller. 3751

8. Report of a Visit to Schools for Crippled Children.
9. The Care and Training of the Mentally Handicapped. 6424-6425
10. How I Can Aid the Handicapped Members of My Community.
11. Jane Addams and Hull House. 35-36, 3280

Part Three. Our American Political Institutions

UNIT TWELVE

How We Govern Ourselves

Elements of the Unit

- A. Why We Need Government.
- B. Different Forms of Government.
- C. Our Local Governments.
- D. Our State Government.
- E. Our National Government.

Questions, Problems, and Exercises

- A. Why We Need Government.

References:

- The Story of Civil Government. 1442-1443
 Government. 2882
 Mayflower Compact. 5665-5666

1. What is meant by the word *government*? 2882
2. Why do we have government?
3. What is the general purpose of all government? 2882
4. What does government do for people? 2882
5. What was the Mayflower Compact? 5665-5666
6. Why did the Pilgrims draw up the Mayflower Compact? 5666
7. Does the government assume control of any matters directly relating to the welfare of individuals which might be trusted to private enterprise? If so, name some. 2882
8. What is meant by civil government? 1442
9. What is meant by centralized government? Decentralized government? Discuss advantages and disadvantages of each form. 1442-1443
10. What is civics? 1443
11. Discuss the following sentence: "The duties of a citizen toward the government are as much a part of civics as the duties of the government toward the individual." 1443
12. Is government more necessary now than in primitive times? Did the American colonists need government as much as we do? Explain.
13. Will the need for government be greater fifty years hence than at present? Give reasons for your answer.

- B. Different Forms of Government.

References:

- Aristocracy. 381
 Democracy. 1888
 George Junior Republic. 2753-2754
 Government. 2882-2883
 Tribal Government. 3674
 Principality (Liechtenstein). 3977
 Monarchy. 4579
 Oligarchy. 5192
 Republic. 6062-6063
 Soviet. 6724
 Theocracy. 7141
 Vatican City. 7468, 5343

1. What are the views of socialists concerning government? Of anarchists? 2882
2. What is nihilism? 2882
3. Define and distinguish between autocratic and constitutional governments. Which form do we have? 2882
4. List the countries, if any, which have autocratic governments. 2882-2883
5. What is an aristocracy? What does the term literally mean? Is our own government an aristocracy? 381
6. What is an oligarchy? Is there anything to be said in favor of oligarchical rule? If so, what? 5192
7. Define monarchy. Upon what theory is this form of government based? 4579
8. What is a theocracy? 7141
9. What is meant by *popular* government? 2882-2883
10. Name the ancient country which is usually cited as the most striking example of popular government. 2883
11. Define democracy. What is the difference between a pure democracy and a representative democracy? Name examples of each. 1888
12. What form of government does England in reality have? 2883
13. What is a republic? Describe how such a form of government works. 6062
14. Name nine countries which have a republican form of government. 2883

15. What is the most conspicuous example in the world of a successful republic? 6063
16. What is the largest republic in the world? The smallest? 6063
17. Distinguish between a democracy and a republic. Which form do we have?
18. Describe the present form of government in Italy. 2883

C. Our Local Governments: Town, Village, City, Township, and County.

References:

Alderman. 197
 Charter. 1319
 City. 1437-1439
 City Manager. 1439
 Commission Form of Government. 1584-1585
 Common Council. 1586
 Constable. 1624
 County. 1721
 Justice of the Peace. 3723
 Mayor. 4356
 Municipal Government. 4742-4743
 Municipal Ownership. 4743-4744
 Town Meeting. 7228-7229

1. Why do we have local governments? 4742
2. What is meant by municipal government? What is its function? 4742-4743
3. Name five units of local government.
4. Describe the organization of village government. 4743
5. What is a town meeting? What is a township? Describe a town meeting. 7228
6. What is a justice of the peace? What are his duties? How does he obtain office? 3723
7. What is a county? What are its officers, and how are they elected? 1721
8. What is one of the largest villages in the United States? What is its population? 1437
9. What makes a city a city? How many people does it take to make a city? Why are villages eager to incorporate as cities? 1437
10. In what way is the city government different from village government? 4743, 1586
11. What is a charter? Who authorizes it? What does it contain? 4742, 1319
12. Name some public activities with which the city government is concerned. 4743
13. What are some types of city government? 4743
14. What is meant by municipal home rule? 4743
15. What is a city manager? 1439
16. Describe the city-manager plan of government. How extensive is this plan in use to-day? What are some possible advantages of this form of government? 1439, 4743

17. Describe the commission form of government. What was the first city to adopt this form? Why did it do so? How many men usually compose the commission? What are some advantages of the system? Is it a democratic form of local government? Explain. How many cities now use the commission form of government? 1584-1585
18. What is a mayor? How does he obtain office? What are his duties and powers? What salary does he usually receive? Do cities which have adopted the commission form of government or the city-manager plan have a mayor? 4356
19. What is meant by the council-mayor plan of city government? 4743
20. What is the smallest city in the United States? What is its population? 1437
21. Name the officers of a city. 1437-1438
22. What is an alderman? How is he elected and what are his powers? Does he receive a salary? 197
23. Write a paper of a page or two in length on the following subject: "Advantages and Disadvantages of Municipal Ownership." 4743-4744

D. Our State Government.

References:

Assembly. 457
 Governor. 2883
 Legislature. 3924
 State House of Representatives. 6062
 State. 6813-6814
 State Government. 7389

1. What is the meaning of state? 6813
2. How does the ancient idea of state differ from the modern? 6813
3. Is the use of the word *state* the same to-day as it was in colonial America? What is the difference? 6813-6814
4. Memorize and be able to elaborate the ideas in Sir William Jones' five lines of poetry on page 6813.
5. As an individual citizen, to which are you more closely related, the state government or the national government? Explain. 7389
6. Do the state governments resemble the Federal government? Explain. 7389
7. Discuss the form of state government: its officers, their election, etc. 7389
8. Of what does the state house of representatives consist? 6062
9. What is a governor? What are his duties? How is he elected? What salary does he receive? 2883
10. What is the legislature of the state? What are its duties? 3924
11. Over what matters does the state have control? 7389

12. What is meant by the word *assembly*? 475
- E. Our National Government.
References:
 Congress. 1606-1607
 The Story of the American Congress. 1607-1609
 Constitution. 1629-1630
 Constitution of the United States. 1631-1634
 Legislature. 3924
 President of the United States. 5802-5808
 House of Representatives. 6060-6062
 Senate. 6488-6491
 Speaker. 6745
 Department of State. 6814
 Secretary of State. 6814-6815
 The Federal Government. 7387-7389
 Congress. 7388
 Veto. 7514
 Vice-President. 7515-7516
 Washington, D. C. (government). 7642
1. Why is the national government called a Federal government? 7387-7388
2. What is the constitution of a nation? 1629
3. Is the Federal Constitution the supreme law in the United States? Is it in Great Britain? 1629
4. What is the relation of the Federal Constitution to the state constitutions? Tell how the relation of a state to the United States differs from the relation of a county to a state. 1721, 1631
5. What provision of the Constitution has received praise from foreign critics? 1632
6. How many members of the Constitutional Convention signed the Constitution? How was it adopted? Which state was the first to ratify it? Which was the last? 1634
7. How does a constitution differ from laws enacted by legislative bodies? Explain. 1629-1630
8. Who may be President of the United States? What are the qualifications? Describe the inauguration of the President. 5802, 5806
9. How many times may a President be re-elected? 5802
10. What are the powers and privileges of the President? 5806-5808
11. What salary does the President receive? 5808
12. What are the qualifications of the Vice-President? What are his duties? 7516
13. What is meant by the phrase *accidental President*? 7516
14. What are the three branches of the national government? What are the duties and powers of each? 7388
15. What is the legal designation of the law-making body of the United States? 7388
16. What does the word *congress* mean? 1606
17. Name some great congresses which have been influential in European affairs. 1607
18. What is the Congress of the United States? Of whom is it composed? 1607
19. What is the legal title of the Congress of the United States? 1607
20. How is Congress organized? Describe. 1607-1608
21. List the powers of Congress. Discuss fully. 1608-1609
22. Explain why Congress is restricted in its powers of legislation. 1608
23. What is the United States Senate? Of what is it composed? What are the qualifications of a United States Senator? How is he elected?
24. The United States Senate is a continuous body. What is meant by that expression? Is this a good condition? 6490
25. What are the duties of the Senate? Who is the presiding officer? What other officers are there? 6490-6491
26. Why is the House of Representatives called the *popular* branch of Congress? 1608
27. What is the presiding officer of the House of Representatives called? 1608
28. Like what foreign law-making body is our House of Representatives? 6060
29. What is the number of Representatives in Congress? How is the number determined? 1606
30. What is the length of term of Representatives in Congress? Why does the Constitution decree such a short term? 6060
31. May all the Representatives in Congress from one state be chosen from a single locality? Explain. 6060
32. What was the membership of the House of Representatives in 1789? In 1911? In 1921? In 1930? 6060-6061
33. Is the membership of the House composed only of Representatives from the states? Explain. 6061
34. Give the qualifications for membership in the House. Are they the same for all states? 6061
35. Is the House a continuous body, as is the Senate? 6061
36. Why has the question of changing the date on which Representatives assume office been seriously considered? Discuss fully. 6061
37. What two powers does the House have that are denied the Senate? Why, do you think, has this provision been made? 6062
38. What is a Congressman at large? 6062
39. What is the presiding officer of the House called? What are his powers and duties? 6062
40. What are the powers and duties of the members of the House? 6062, 1636-1637

41. What is the purpose and function of the Department of State? 6814
42. What is the Secretary of State? What are his duties? Is it an important office? Explain. 6814-6815
43. How is Washington, D. C. governed? 1970, 7642

Supplementary Enterprises

1. Write a paper on the different forms of government. Make a clear distinction between the different forms, and give advantages and disadvantages of each.
Monarchy. 4579
Democracy. 1888
Aristocracy. 381

Oligarchy. 5192
Government. 2882-2883
Republic. 6062-6063
Theocracy. 7141
Soviet. 6724

2. Various Forms of City Government. 1584-1585, 1437-1439, 1586
3. The Home of Our Federal Government, 7636-7644, 7747-7750, 1970-1971
4. The Constitutional Convention.
5. How Primitive Peoples Govern Themselves.
6. Junior Republic. 2753-2754
7. Why We Need Government
8. School Government.

UNIT THIRTEEN

How Laws Are Made

Elements of the Unit

- A. Laws and Why We Have Them.
- B. How Constitutions Are Made and Changed.
- C. How Statute Laws Are Made.

Questions, Problems, and Exercises

- A. Laws and Why We Have Them.
References:
Blue Laws. 805
"Blue Sky" Laws. 806
Civil Law. 1449
Code Napoleon. 1523-1524
Common Law. 1586
Criminal Law. 1746
Equity. 2284, 3897
Geneva Convention. 2716
"The Legislature of the Everglades." 3427
International Law. 3485-3487
Law. 3897
Lynch Law. 4163
Martial Law. 4307-4308
Personal Liberty. 5504
Statute. 6817
1. What is personal liberty? What happens to one's personal liberty as civilization becomes more complex? How far should one's personal liberty extend? What is the difference between liberty and license? Explain Madame Roland's statement: "O liberty! liberty! how many crimes are committed in thy name!" 5504
2. Are more laws needed in a modern civilization than in a primitive one? Explain.
3. What is law? What purpose does it serve? 3897
4. How does law originate? Explain. 3897
5. Explain the meaning of common law? Upon what is common law usually based? Do we have common law in the United States? 1586, 3897

6. What is meant by statute law? By what bodies is statute law enacted?
7. What is criminal law? 1746
8. What is civil law? Name some offenses which would be prosecuted under civil law. 1449
9. What are "blue laws?" Why were they called "blue" laws? Read the blue laws found on page 805. What do you think of them? Do we have blue laws to-day?
10. What are "blue sky" laws? 806
11. What is martial law? When is it put into force? 4307
12. What is lynch law? How does it operate? Is it just? 4163
13. What is meant by the law of equity? Explain as well as you can. 3897, 2284
14. What is parliamentary law? Should the individual citizen be familiar with parliamentary law? Why? Study this section carefully. Ask your teacher for permission to organize your class according to parliamentary practice. 5395
15. What is the Code Napoleon? 1523-1524
16. Define the following terms: Substantive law, remedial law, public law, private law, constitutional law, administrative law. 3897
17. What is international law? Upon what is it based, or wherein does it originate? With what does it deal? 3485-3487, 3497
18. Give some important distinctions between international and municipal laws? 3485
19. What are the principal sources of international law? How are these laws made? 3485
20. What three great conferences or conventions have been influential in codifying and putting into writing the rules of international law? 3485, 5425-5426, 2716

21. What are some of the duties and rights of sovereign states with which international law deals? 3485-3486
22. What usually happens to international law in time of war? What are some rules of various international conferences for the conduct of warfare on land? For naval warfare? 3486

B. How Constitutions Are Made and Changed.

References:

Amendment. 246

Bill of Rights. 739-740

Constitution. 1629-1643

1. What is a constitution? 1629
2. Why is a constitution sometimes called a fundamental law? 1629
3. How does a constitution differ from laws enacted by legislative bodies? 1629
4. Describe the Constitution of the United States. Did the framers of this document pattern it after any existing constitution? 1631
5. Read the entire Constitution of the United States. 1635-1643
6. Tell briefly the history of the Constitution. Why was a constitution necessary? When and how was it framed? How long did it take? What difficulties beset the members of Congress during the framing of the Constitution? Discuss some of the conflicts and compromises. 1632
7. Study carefully the Outline of the Constitution. How is the Constitution organized? 1632
8. What happens when a law passed by Congress violates the provisions of the national Constitution? 1632
9. What are the most important provisions of a constitution?
10. Are constitutions easily changed? What does the term *amendment* mean? What is a general rule concerning amendments? 246, 1630, 1634
11. How may the Constitution be amended? What amendments to the Constitution have been made? 1634, 246
12. What is meant by the expression "constitutional changes through interpretation"? Why do such changes have to be made? 1634
13. What Constitutional changes may probably be made within the next few years? 1634
14. What is a Bill of Rights? 739
15. What is the "American Bill of Rights"? 739
16. What does the bill of rights of a state constitution contain? 739

C. How Statute Laws Are Made.

References:

Bill, in Law. 737

Common Council. 1586

Congressional Record. 1607

Filibusters. 2415

Initiative and Referendum, 3452-3453

How a Bill Becomes a Law, 3898

Legislature, 3924-3925

City Government, 4743

Village Government, 4743

Omnibus Bill, 5199-5200

Recall, 6021

Repeal, 6059

Statute, 6817

Duties of the Senate, 6490

Village Trustees, 7284-7285

Veto, 7514

1. What is statute law? How does statute law differ from common law? Give some illustrations of statute law. 6817
2. What is the legislature? 3924
3. What is the national legislature called in the United States? In England? In Canada? 3924
4. What is the legislature of a state called? 3924
5. What is the purpose of the legislature? 3924
6. What are the two "houses" of the legislature called? 3924
7. Can one house alone enact a law? 3924
8. What is the legislative body of a city? Of a village? 3924
9. What is a "bill"? What is an "omnibus" bill? 737, 5199-5200
10. Who may introduce a bill? Study the paragraph and picture on page 3898. Be able to explain how a bill becomes a law.
11. Make a list of the duties of the Senate. 6490
12. What does the word *veto* mean? 7514
13. To whom is the power of veto given? 7514
14. Define the following terms: Absolute veto, limited veto, pocket veto. 7514
15. May the veto of the President of the United States be overruled? 7514
16. What does the President do when he vetoes a bill? 7514
17. What happens to a bill if the President of the United States fails to sign or veto it within ten days after it has been presented to him? 7514
18. May a governor exercise the power of veto? A mayor? 7514
19. Explain what is meant by repeal; filibustering. 6059, 2415
20. What is the *Congressional Record*? 1607
21. Define and explain initiative and referendum. 3452-3453
22. Explain how a law may be enacted by

means of the initiative. How widely are initiative and referendum laws in force?

3453

23. What is meant by the recall? What is the purpose of the recall? How may an official be recalled? Explain. 6021
24. What is the legislative department of an incorporated village called? Of what does it consist? 7284-7285
25. What is the common council? 1586
26. Who makes the laws for a city? 1437-1438, 4743

Supplementary Enterprises

1. Why Laws Are Necessary.
2. The Unwritten Laws of Primitive Peoples of the World.
3. International Law.
4. Law Schools.
5. Law as a Profession.
6. Making and Changing Constitutions.
7. Making Statute Law.
8. How Ordinances Are Made.
9. Debate: Resolved, That our state should adopt the initiative and the referendum.

UNIT FOURTEEN

How Laws Are Enforced

Elements of the Unit

- A. Enforcing Local Laws.
- B. Enforcing State Laws.
- C. Enforcing National Laws.

Questions, Problems, and Exercises

- A. Enforcing Local Laws.

References:

Board of Health. 808
 Constable. 1624
 Coroner. 1696
 County. 1721
 Fire Department. 2429-2433
 Justice of the Peace. 3723
 Mayor. 4356
 Village Government. 4743
 City Government. 4743
 Police. 5701-5702
 Sheriff. 6557
 Town Meeting. 7228-7229

1. Explain this statement: "Violation of a just law lessens the liberty of someone else."
2. What is the primary purpose of law enforcement?
3. Should every law be enforced? Give reasons for your answer.
4. Why is there usually an official in athletic games? Would you care to play an important team game without an official? Why?
5. What is good sportsmanship in community life?
6. Why do we need officials to enforce the law? Why are some laws more easily enforced than others? Why are some laws obeyed with apparently no enforcement?
7. Try to find out how many laws there are in your community which are being enforced. Are there any which are not being enforced?
8. Does law enforcement necessarily mean pursuing criminals?

9. Who is responsible for law enforcement in a New England township? 7228-7229
10. What officers are charged with the responsibility of enforcing the law in the county? What are the duties of each? 1721, 6557, 1696
11. Who is the executive head of a village? What are the officers of a village? 4743
12. Who is the executive head of a city? What are his duties? 1437, 4743, 4356
13. Who enforces the laws of a city?

- B. Enforcing State Laws.

References:

Auditor. 498
 Governor. 2883
 State Attorney-General. 3723
 Lieutenant Governor. 3978
 Militia. 4480
 State Police. 5702

1. Upon whom does the main responsibility for law enforcement in the state rest? 2883
2. What is a lieutenant governor? What are his duties? 3978
3. What are the duties of the state attorney-general? 3723
4. What are the duties of the state police? 5702
5. May the governor call upon the militia for aid in enforcing law? Discuss.
6. What are the duties of a state auditor? 498

- C. Enforcing National Laws.

References:

Department of Agriculture. 104-106
 The President's Cabinet. 1058
 Cabinet. 1058-1059
 Civil Service. 1449-1451
 Department of Commerce. 1583
 Department of the Interior. 3478
 Interstate Commerce Commission. 3490-3491
 Department of Justice. 3722-3723

Department of Labor. 3821
 Marshal. 4304
 Department of the Navy. 4852
 President of the United States. 5802-5808
 Secret Service. 6477-6478
 Department of State. 6814-6815
 Treasury Department. 7255-7256
 War Department. 7600

1. Who is responsible for the execution of all national laws? 5802
2. What officer in the United States government is one of the most powerful rulers in the world? 5802
3. What are the duties and powers of the President? 5806-5808
4. Who succeeds the President of the United States in case, for any constitutional reason, he is permanently unable to fulfill the duties of his office? 7515
5. Who stands first in the line of succession to the Presidency in the event of the death or permanent disability of the President and Vice-President? 6815
6. Who is fourth in line among Cabinet members for succession to the Presidency? 3723
7. How many departments are there in the Executive branch of the government? Name them in the order in which they were created. 1058-1059
8. What is the President's Cabinet? 1058-1059
9. How do Cabinet members obtain office? 1059
10. How many men comprised Washington's first Cabinet? 1059
11. To which office in the Cabinet is attached the greatest prestige? 1059
12. What salary do Cabinet members receive? 1059
13. What are the duties of the Secretary of State? Explain the importance of his office. 6814-6815
14. Describe the organization of the Department of State. What is the business of the department? 6814
15. What are the duties and powers of the Treasury Department? Discuss fully. 7255-7256
16. What is the Department of Justice? Is it

the same as the Judicial Department?
 3722

17. Who is the head of the Department of Justice? What are the duties of the department? 3722
18. What are the powers and duties of the War Department? Who is commander in chief of the army? What are the duties of the Secretary of War? 7600
19. What is the work of the Department of the Navy? 4852
20. What are the functions of the Department of the Interior? Explain this phrase: "An Act to Establish the Home Department." 3478
21. Discuss the history and activities of the United States Department of Agriculture. 104-106
22. What are the activities of the Department of Commerce? 1583
23. What is the Attorney-General? Is his office an important one? 3723
24. For what specific purposes was the Department of Labor established? What are the different divisions or bureaus of the department? 3821
25. What are the duties of the United States Secret Service? 6477-6478
26. Find the clause in the Constitution which authorizes the President to call out the state militia to enforce national law. 1635-1643
27. What is the civil service? What does the term mean? 1449
28. Why was the Civil Service Act passed? What was its purpose? 1449
29. What is the Civil Service Commission? 1450
30. What are some advantages in having government positions placed under civil-service regulation?
31. How may one secure a position in the civil service? Explain fully. 1450
32. How many employees are necessary to conduct the business of the United States government? 1449-1450
33. What is meant by civil service reform? Spoils system? The merit system? 1450-1451
34. What is a United States marshal? What are his duties? 4304

UNIT FIFTEEN

How Laws Are Applied and Interpreted

Elements of the Unit

- A. What Courts Are, and Why We Need Them.
- B. Local and State Courts.
- C. Federal Courts.
- D. Court Procedure.

Questions, Problems, and Exercises

- A. What Courts Are, and Why We Need Them.
- References:
 Avenger of Blood. 800
 Cities of Refuge. 1435

Courts. 1722
 Lynch Law. 4163
 Trial by Ordeal and Combat. 5241
 Sanhedrin. 6374
 Vendetta. 7476

1. How were disputes settled in primitive societies? Have any of these methods survived? Explain. 800, 1435, 5241, 7476
2. What are courts? 1722
3. At the present time are all disputes settled in courts?
4. Why is the settlement of disputes between individuals not left entirely to the individuals themselves?
5. What is the difference between an offense against the state and an offense against an individual? Give several illustrations of each.
6. If we had no courts, who would fix penalties for violations of the law? Do groups of citizens ever "take the law in their own hands"? Discuss.
7. What is the primary function of courts? 1722
8. Which is the more important function of the courts, fixing penalties for violation of the law or protecting the rights of individuals and society? Explain.
9. What was the Sanhedrin? 6374

B. Local and State Courts.

References:

Court of Chancery. 1302-1303
 Chief Justice. 1369
 Court of Common Pleas. 1586
 County. 1721
 Courts. 1722
 States Judicial Systems. 1722-1723
 Equity. 2284
 Justice of the Peace. 3723
 Probate. 5829

1. Distinguish between private law and public law. Which affects the individual most frequently? Explain. 3897
2. Distinguish between original jurisdiction and appellate jurisdiction. What is an appellate court? 1722-1723
3. What is the difference between a crime and a civil wrong? Give illustrations of civil cases and criminal cases. 1745-1746, 7221
4. If a crime has been committed, should a settlement between the parties concerned be made out of court, if possible? Explain.
5. What are the courts of a county? 1721, 1723
6. What is a justice of the peace? What are his duties? 3723
7. What is the highest judicial tribunal in the state? 1722

8. Describe the general features of the state judicial system. 1722-1723
9. What is a chief justice? In most states, who acts as chief justice of the court? 1369
10. What is the court of common pleas? 1586
11. What is a court of chancery? 1302-1303
12. Explain the function of a court of equity. 2284
13. Explain the following statement: "Equity considers that done which ought to be done." 2284
14. What is a probate court? 5829

C. Federal Courts.

References:

Chief Justice. 1369
 Court of Claims. 1452
 Constitution (Article III). 1639
 Court-Martial. 1722
 United States Judicial System. 1722-1723
 Supreme Court of the United States. 6940-6942

1. What is the highest judicial tribunal in the American republic? 6940
2. Was the Supreme Court authorized in the Constitution of the United States? 6940
3. To what body was the organization of the Supreme Court delegated? 6940
4. What are the members of the Supreme Court called? 1722, 6940
5. What is the head of the Supreme Court called? 1369
6. Who appoints the members of the Supreme Court? How long is the term of office? What salary does a Justice of the Supreme Court receive? 1722, 6940
7. Read carefully the classes of cases which come under the jurisdiction of the Supreme Court. Explain why such cases should be handled by a Federal Supreme Court rather than a lower court. 1723, 6940
8. What provisions are made in the Constitution for removing members of the Supreme Court from political influences? 6940
9. What power does the Supreme Court possess over legislation, both state and national? Is this an unusual power? 6940
10. Does the Supreme Court have original or appellate jurisdiction? Explain. 1723
11. Describe the organization and jurisdiction of the ten kinds of United States courts. 1723
12. What are the lower, or inferior, Federal courts? 1722, 6940-6942
13. How many circuit courts of appeals are there? Who supervises these courts? 6942

D. Court Procedure.

References:

- Appeal. 321
 Arrest. 420
 Attachment. 494
 Bail. 572
 Contempt. 1644
 Court Procedure. 1723-1724
 Crime. 1745-1746
 Criminal Law. 1746
 Demurrer. 1891
 Evidence. 2336-2337
 Execution. 2343
 Felony. 2393
 Writ of Habeas Corpus. 2997
 Indictment. 3430
 Injunction. 3453-3454
 Judge. 3705
 Judgment. 3705
 Jury and Trial by Jury. 3721-3722
 Law. 3897
 Mandamus. 4252
 Misdemeanor. 4533
 Oath. 5136
 Trial by Ordeal and Combat. 5241
 Perjury. 5489
 Probate. 5829
 Replevin. 6059
 Subpoena. 6894
 Warrant. 7621
 Witness. 7816
 Writ. 7897-7898
 Writs of Assistance. 7901
1. What is the meaning of court procedure? 1723
 2. What is crime? Is an act of omission a crime? Give illustrations of acts of commission and acts of omission which are crimes. 1745-1746
 3. What is meant by the term civil suit? 1854; 1723-1724
 4. What is the first step in a civil suit? 1723-1724
 5. Define and explain the following terms: Writ of summons, defendant, plaintiff, pleadings, issue, demurrer, arrest, examination. 1723-1724, 420, 1891
 6. What is the meaning of writ? 7897
 7. What is a writ of *habeas corpus*? How is it used? Explain fully. 2997
 8. Define and explain the writ of replevin. How is it used? Give an illustration. 6059
 9. When is a writ of mandamus issued? What is its purpose? 4252
 10. How is the writ of attachment used? 494
 11. Define warrant, bench warrant, search warrant. 7621
 12. Who usually makes arrests? May a private citizen make an arrest? Does an arrest deprive a person of his liberty? What may an arrested person do to enjoy full

liberty until his case is called for trial?

13. What is bail? May all persons who are arrested apply for liberty on bail bonds? Why? 572
14. Explain the meaning of subpoena. For what is a subpoena used? What is a subpoena *duces tecum*? 6894
15. What does appeal mean in law? Explain. 321
16. What is a witness? What is the summons by which a witness is ordered to appear in court called? Are all persons competent to give legal testimony in court? 7816
17. What is evidence? Discuss the various kinds of evidence. 2336-2337
18. Explain what is meant by an indictment (in criminal law). What are its purposes? Give the essentials of a valid indictment. 3430
19. What is the meaning of injunction (in law)? Define the following words, used in connection with injunction: Preventive, mandatory, preliminary, interlocutory, and perpetual. Give illustrations of preventive and mandatory injunctions. 3453-3454
20. Define perjury. What is subornation of perjury? What is the punishment for perjury? 5489
21. What is an oath (in law)? What is required of a person who takes a judicial oath? What are extra-judicial oaths? Have you ever taken one? What is the difference between an oath and an affirmation? 5136
22. What are the duties of a judge?
23. What is a jury? A grand jury? A coroner's jury? A petit jury? How many persons are there on each? Who selects them? 3722
24. What is one of the principal objections to the jury system? 3722
25. What is the offense known as contempt of court? Discuss two kinds of contempts of court. 1644
26. Define and explain indeterminate sentence. Discuss its advantages and disadvantages. 3377
27. Follow a hypothetical criminal case through the courts, explaining each of the steps in complete court procedure. Do the same for a civil case.

Supplementary Enterprises

1. Trials by Ordeal and Combat. 5241
2. The Courts of Canada and Great Britain. 1724
3. Report of a Visit Made to a Court in Session.
4. Why We Need Courts.
5. Our National Judicial System. 1722-1723
6. The Supreme Court. 6940-6942

UNIT SIXTEEN

How We Select Our Officials

Elements of the Unit

- A. Political Parties, and Why They Are Formed.
- B. Political Parties at Work.
- C. How We Elect Our Officials.

Questions, Problems, and Exercises

- A. Political Parties, and Why They Are Formed.

References:

Anti-Federalist Party. 310
 Bucktails. 996
 Democratic Party. 1888-1889
 Democratic-Republican Party. 1889
 Federalist Party. 2390
 Free-Soil Party. 2603
 Greenback Party. 2956-2957
 Know-Nothings. 3808-3809
 Liberal Republican Party. 3961
 Liberty Party. 3965-3966
 Loco-Foco. 4076
 Political Parties. 5703-5706
 Populist Party. 5740
 Progressive Party. 5831
 Prohibition Party. 5833-5834
 Republican Party. 6063-6064
 Socialism. 6668
 Whig. 7740

1. What is meant by the statement that a political party is "a second, or unofficial, government"? 5703
2. Did political parties exist during the colonial period? 5704
3. Approximately what percentage of public officials in the United States is elected by a party vote? Is this peculiar to the United States? 5703
4. To what degree has the party spirit permeated American life? 5703
5. Are there any disadvantages in the party system? Explain. 5703
6. What are the five main objects or lines of action of the party system in the United States? 5703
7. Who were the Whigs? 5704-5705, 7740
8. Who were the Federalists? 2390, 5705
9. Who were the Anti-Federalists? 310, 5705
10. Tell briefly the history of the Democratic party. 1888-1889
11. What is the oldest political organization in the United States? 1888
12. When was the Republican party organized? With what great American problems were the early Republicans concerned? What was the chief plank in its platform in 1856? What were the issues particularly stressed in the last campaign? 6063-6064
13. Are the distinctions between the policies

- of the Republican and Democratic parties as great now as they used to be?
14. Who were the Progressives? 5831
 15. What was the primary object of the Prohibition party? When was it formed? Has the party been influential? 5833-5834
 16. Who were the Bucktails? How did they derive their name? 996
 17. What was the Free-Soil party? 2603
 18. What was the Greenback party? 2956-2957
 19. Who were the Know-Nothings? Why were they so called? 3808-3809
 20. What was the Liberty party? 3965-3966
 21. Tell about the Liberal Republican party. 3961
 22. Who were the loco-focos? 4076
 23. Give the history of the Populist party. 5740

- B. Political Parties at Work.

References:

Caucus. 1259-1260
 Machinery of Parties. 5703-5704
 Primary Election. 5811

1. Who is usually the leader of his party? 5703
2. Who controls the parties? What did James Bryce have to say about political parties? Do you agree with him? 5703
3. What is meant by party machinery? 5703
4. What is the essential difference between the permanent and temporary organization of a party?
5. What are the primary purposes of party committees? 5704
6. What is a party convention? What is done at a party convention? Who attend party conventions? 5704
7. Define primary. Explain fully what is done at a primary election. Are all members of a party entitled to vote at a primary? Explain. 5704, 5811
8. Are primaries restricted to local elections? 587
9. Is the direct primary an American institution? 5811
10. Define caucus. Are caucuses held nowadays? Discuss. 5704, 1259-1260
11. What is the difference between a caucus and a primary?

- C. How We Elect Our Officials.

References:

Australian Ballot. 521-522
 Ballot. 586
 Constitution. 1641-1642
 Election. 2164-2165

Electoral College. 2166-2167
 Electoral Commission. 2167
 Grandfather's Clause. 2896
 How a President Is Elected. 5802-5806
 Short Ballot. 6571-6572
 Suffrage. 6904-6905
 Voting Machine. 7569-7571
 Woman Suffrage. 7822-7825

1. What is the meaning of suffrage?
2. Who may vote for public officials in the United States? 6905
3. May a person be a citizen and yet not have the right to vote? Explain.
4. What percentage of the population during the early years in the United States was permitted to vote? Explain. 6905
5. What is a ballot? 586
6. What is the derivation of the word *ballot*? 586
7. Describe the methods of voting by ballot used in ancient Athens. What methods did the Romans use? 586
8. What is the Australian ballot? How did it get its name? When was it first used in the United States? What are its two essential features? 521-522
9. Describe the method of voting before the introduction of the Australian system. 521, 586
10. Who furnishes the ballots under the Australian system? Why? 521
11. Describe some of the features of the Australian ballot used in Canada. 521
12. What is meant by "voting a straight ticket"? 521
13. What is meant by "scratching" the ballot? 521
14. Be able to explain fully the correct procedure in marking a ballot. 521
15. Explain the procedure used in counting the ballots. 521-522
16. What is meant by the short ballot? What are the proposals of the short-ballot movement? Discuss the advantages of the short ballot. 586, 6571-6572
17. What is a voting machine? Has it been used widely in the United States? Ex-

plain how the machine works. What advantages are claimed for it? 7569-7571

18. Define the following terms as used with respect to elections: Direct, indirect, representative, national, state, and provincial. 2165
19. What is meant by registration? 2165
20. Who bears the expense of elections? 2165
21. What does the term *blackballed* mean? 586
22. Explain how the President of the United States is elected. Be sure to read carefully the selection entitled "Six Roads to the White House." 5802-5806, 1641-1642
23. What is the difference between the popular vote and the electoral vote? By which is the President elected? Do the citizens vote for President or for electors? Explain. 5806, 2166-2167
24. What is the Electoral College? How many electors are there in the Electoral College? 2164, 2166
25. Who are the electors and how are they chosen? What are their duties? 1641-1642, 2164, 2166-2167, 5802-5806
26. Do the electors have the right to cast their ballots for whomsoever they choose? 2166
27. What is woman suffrage? Tell the history of the woman suffrage movement in the United States. 7822-7824
28. Tell the history of suffrage in the United States. 6904-6905

Supplementary Enterprises

1. The History of Political Parties in the United States. 5704-5706
2. National League of Women Voters. 4815-4816
3. Woman Suffrage. 7822-7825
4. The Work of Political Parties.
5. Why We Have Political Parties.
6. Early Methods of Voting. 586, 6905
7. The History of Suffrage in the United States. 6904-6905; 7822-7825
8. Jefferson and Hamilton as Leaders of Our First Political Parties.

UNIT SEVENTEEN

How We Finance Our Government

Elements of the Unit

- A. Why Our Government Needs Money.
- B. Sources of Income.
- C. Levying and Collecting Taxes.

Questions, Problems, and Exercises

- A. Why Our Government Needs Money.

References:

National Debt. 4813-4814

Tax and Taxes. 7032-7033

1. Why should the citizen pay revenue to the government? 7033
2. List all the services which the local, state, and national governments perform for you. Who are on the payroll of these governments?
3. What are the expenses of local governments, such as town township, county, village, and city?

4. What are the chief expenses of the state government?
5. What are the services which the national government performs which cost money?
6. What were the expenditures of the national government in 1916? In 1919? Now? 3375, 3483
7. Why does it cost more to run governments to-day than a century ago?
8. What was the United States public debt in 1928? How does the country accumulate such debts? 4814
9. How much, in money, did the World War cost the United States? 7891
10. What was the annual cost of maintaining the regular army before 1917? How much is it now? 416
11. How much did Congress appropriate in 1916 for the construction of naval vessels? 4848

B. Sources of Income.

References:

Customs Duties. 1793

Escheat. 2292

Franchise. 2589-2590

Income Tax. 3374-3375

Inheritance Tax. 3451-3452

Internal Revenue. 3482-3483

License. 3974-3975

Poll Tax. 5714

Sales Tax. 6331-6332

Single Tax. 6621-6622

Story of the Tariff. 7021-7024

Tax and Taxes. 7032-7034

1. Discuss four means by which revenue to defray governmental expenses can be secured. 3483
2. What is the chief source of income for all the units of government? 7033
3. What is a tax? 7032
4. How long has taxation as a means of obtaining revenue been employed? Discuss. 7032
5. What is the present theory of taxation? 7033
6. What are some principles which should govern taxation? 7033
7. What is the chief difference between direct and indirect taxes? 7032
8. What is an income tax? Upon what theory are incomes below a certain amount exempt from taxation? Tell the history of the income tax in the United States. 3374-3375
9. What is an inheritance tax? How long has this source of government revenue been in use? How widely is this form of taxation used? Do all states levy an inheritance tax? What do economists think of it? 3452
10. What is the single tax? State the theory

- of the single tax. What are some objections that have been advanced against it? 6621-6622
 11. What effect would the adoption of a national single tax have upon other sources of income? What are some of the obstacles in the way of a national single tax? What advantages do advocates of the national single tax claim for it? 6621-6622
 12. What is internal revenue? Distinguish between internal revenue and foreign revenue. 3482-3483
 13. Upon what articles is an internal-revenue tax usually placed? What are some objections to internal-revenue taxes? 3483
 14. Why does the country resort to internal-revenue taxes during time of war? 3483
 15. Has the United States ever levied direct taxes upon property? 3483
 16. Do license fees help pay the expenses of the government? Explain. 3974-3975
 17. Do franchises form a source of revenue for the government? 2589-2590
 18. What is a poll tax? Is it an important source of revenue? 7032
 19. Define and discuss escheat. 2292
 20. What is a sales tax? 6331-6332
 21. Define tariff. For what purposes are tariffs levied? Is the practice of collecting revenue by means of tariffs of recent origin? When was the first national tariff law passed in the United States? 7021-7022
 22. Tell the history of tariff in the United States. 7022-7024
 23. Is insurance on parcel-post packages a tax?
 24. Have you ever purchased an article on which there was a government stamp? Does this stamp represent a tax?
- #### C. Levying and Collecting Taxes.
- ##### *References:*
- Assessor. 457
- Budget. 1000-1001
- Taxation in Practice. 7033
- Treasury Department. 7255-7256
1. What two fundamental questions must be answered before money can be raised by property taxes? Explain. 7033
 2. Read carefully the selection entitled *The Mathematics of Taxes*. 7033-7034
 3. Study carefully the diagram on page 7032.
 4. Does the Federal government levy taxes? 7389
 5. What Executive department of the United States government collects all taxes levied by Congress? 7255
 6. What kinds of taxes are levied by Congress? 7255
 7. Explain how internal-revenue taxes and fees are collected. 7255

8. What is a budget? What is the purpose of a budget? Tell how the United States adopted the budget plan for governmental expenses. 1000-1001
9. What is an assessor? What are his duties? Is he a local, state, or national officer? 457

Supplementary Enterprises

1. How the Local Government Pays Its Bills.
2. How the Federal Government Collects Revenue.
3. The History of Tariff. 7021-7024
4. Community Expenses.
5. Kinds of Taxes.

UNIT EIGHTEEN

International Relations

Elements of the Unit

- A. How Nations Depend on One Another.
- B. Our Relations with Other Countries.
- C. Movements for International Peace.

Questions, Problems, and Exercises

- A. How Nations Depend on One Another.

References:

Languages of the World. 3860-3871
 International Bureau of Weights and Measures. 4426
 Nobel Prizes. 5036, 5037

1. Make a list of all the articles which we could not have if all imports from foreign countries should cease.
2. List the articles in your home which came wholly or in part from foreign countries. You will need to investigate carefully.
3. Is the United States more closely related to the rest of the world than is any other single country? Explain.
4. Are the countries of the world more closely related to each other to-day than the states of the Union were one hundred years ago? Explain.
5. To what extent was America dependent upon other nations during the colonial period?
6. In what ways are the nations of the world now interdependent in science, art, music, medicine, literature, and invention? 3485
7. What effect has the development of communication and transportation had upon international relations?
8. Name five books, five musical selections, and five works of art for which we are indebted to foreign countries.
9. Discuss the significance of the Nobel Prizes. 5036, 5037
10. Have any attempts been made to formulate a "world language"? Why? 3860-3871
11. Why is it increasingly necessary to have an international system of weights and measures? Have any attempts been made in this direction? 4426

- B. Our Relations with Other Countries.

References:

Ambassador. 243
 Minister. 243

Attaché. 494

Chargé d' Affaires. 1310

Consul. 1643

Diplomacy. 1955

Exterritoriality. 2348

Foreign Office. 2532

The International. 3483-3484

International Institute of Agriculture. 3485

International Law. 3485-3487

International News Service. 3487

International Relations. 3487-3488

International Postal Union. 5771

Department of State. 6814-6815

Trade-Mark (International Regulations). 7235

1. What is international law? 3485
2. Did primitive communities observe rules comparable to international law?
3. Explain the differences between international and municipal laws. 3485
4. Is international law as we know it to-day of recent origin? Explain. 3485
5. When was the great work of writing and codifying the rules of international law undertaken? 3485
6. What happens to international law in time of war? 3486
7. What are our representatives to foreign countries called? What are their duties? 243, 494, 1310, 1643
8. What is the meaning of exterritoriality? Give your opinion of this doctrine. 2348
9. Explain what is meant by diplomacy. Name the agents of the diplomatic service. 1955
10. Distinguish between the consular service and the diplomatic service. 1643, 1955
11. What office in the United States is comparable to the Minister of Foreign Affairs in Europe? 2532
12. What are the functions of the Department of State? 6814-6815
13. Tell about the work of the International Institute of Agriculture. 3485
14. What are the international regulations with respect to trade-marks? 7235
15. Does the United States government protect American citizens in foreign lands?

C. Movements for International Peace.

References:

International Arbitration. 344
 Limitation of Armaments. 406-407
 Bering Sea Controversy. 713
 Geneva Convention. 2716
 Geneva Arbitration. 2716
 The Hague. 3003-3005
 Interparliamentary Union. 3489-3490
 League of Nations. 3904-3906
 Locarno Conference. 4071-4073
 International Peace Conference. 5425-5426
 Permanent Court of International Justice. 5489-5490
 Red Cross Societies. 6025-6031
 Treaty of Versailles. 7506-7508

1. Read the poem on page 1588.
2. What is arbitration? Do individuals frequently submit their disagreements to arbitration? How? Do states? Do nations? 344, 713, 2716
3. If nations wish to settle their disputes by arbitration, to what court can they go? Explain. 344
4. How was the Bering Sea controversy settled? Describe the procedure. 713
5. What initiative has the United States taken in promoting arbitration as a means of settling international disputes? 344
6. Tell about the attempts which have been made toward the limitation of armaments. 406-407
7. Discuss the terms of agreement of the first and second Geneva conferences. Do you think similar agreements should be reached concerning food ships? 2716

8. For what is The Hague famous? Describe the Palace of Peace at The Hague, and tell about the famous conferences which have been held there. 3003-3005, 5425-5426
9. Describe the organization and function of the Interparliamentary Union. 3489-3490
10. What are the chief objects of the League of Nations? Describe the organization of the League. 3904-3906
11. Where is the city of Locarno located? In what year did the Locarno Conference take place? What were the real accomplishments of the Locarno Conference? 4071-4073
12. Compare the League of Nations and the Locarno Conference.
13. What is the chief difference between the Hague Tribunal and the Permanent Court of International Justice (World Court)?
14. What was the Treaty of Versailles? What objection did the United States Senate have to it? 7506-7508

Supplementary Enterprises

1. Our Imports and Exports.
2. Our Foreign Representatives.
3. Organizations for the Peaceful Settlement of International Disputes.
4. How We Depend on Other Nations for Art, Music, and Literature.
5. Recent Achievements in the Air and Their Relation to World Peace.
6. The Family of Nations.
7. International Law. 3485-3487
8. American Winners of the Nobel Prize. 5036, 5037, 4489-4490, 1216, 7778-7788, 6185-6197, 6197-6198.

Part Four. Economic Civics**UNIT NINETEEN****Producing Goods****Elements of the Unit**

- A. Why We Work.
- B. How We Produce Goods.
- C. Industrial Problems.

Questions, Problems, and Exercises

- A. Why We Work.

References:

Capital. 1184-1185
 Invention. 3493
 Profit. 5830
 Value. 7447-7448
 Wages. 7574-7575
 Wealth. 7685

1. Define *work* and *play*. Consult a good dictionary or a book on economics.

Why do people work? Is it always from a desire to satisfy their material wants? What is the chief difference between work and play? Thomas A. Edison once said: "I think I have never done a day's work in my life." What did he mean?

2. Do primitive peoples work as much as civilized people? Explain.
3. What is the primary motive for invention? 3493
4. Make a list of twenty-five things which we now use or enjoy which did not exist when our fathers were young. Add to the list twenty-five things which our grandfathers knew nothing about. Add ten more things which our great-grandfathers did not have. 3493

5. What were some of the first inventions of man? 3494
6. Debate: *Resolved*: That Necessity Is the Mother of Invention.
7. What is capital? 1184
8. What is wealth? What three attributes must an article have to be classed as wealth? 7685
9. What is profit? Are profits the same as wages? Explain. 5830
10. Does a man work whose business is that of exchanging goods? Explain.
11. What is the difference between free goods and economic goods? Give several examples of each. Do we work for free goods? Explain. 7685
12. What is the meaning of utility? 7748

B. How We Produce Goods.

References:

Arts and Crafts. 437
 Factory and Factory System. 2359-2360
 The Story of Invention. 3493-3500
 Division of Labor. 3821-3822
 Changes Made by Machinery. 4180
 Standardization in Industry. 6797-6798
 Development of Manufacturing Industries. 7377-7380

1. What is a factory? What is the essential feature of the factory system? How many men does it take to make a factory? 2359
2. When did the factory system of production begin? What helped stimulate its growth? 2359-2360
3. Where were the early factories located? Why? 2360, 7377
4. List the benefits and evils of the factory system. 3822, 2360
5. What is usually the aim of a group of persons who organize an industrial enterprise? 3445
6. What is meant by "standardization in industry"? 6797
7. What are some values of standardization? Some disadvantages? 6797
8. What is mass production?
9. What is the function of the Division of Simplified Practice of the United States Department of Commerce? 6798
10. What is meant by "division of labor"? 3821
11. Explain this statement: "Formerly, the watchmaker was a craftsman; to-day he is chiefly a mechanic or an engineer."
12. What is the purpose of the Arts and Crafts Movement? 437

C. Industrial Problems.

References:

Adamson Law. 35
 Industrial Arbitration. 344

Capital. 1184-1185
 Child Labor. 1375-1376
 Collective Bargaining. 1536
 Eight-Hour Day. 2156-2157
 Employer's Liability. 2220-2230
 Benefits and Evils of the Factory System. 2360
 Samuel Gompers. 2868
 Industrial Workers of the World. 3445
 Knights of Labor. 3807
 Department of Labor. 3821
 Labor Day. 3822
 Labor Legislation. 3822-3824
 Labor Organizations. 3825-3826
 Minimum Wage. 4501-4502
 Open Shop. 5213
 Profit Sharing. 5830
 Sabotage. 6292
 Socialism. 6668-6669
 Strike. 6879
 Sweatshop System. 6948
 Wages. 7574-7575

1. Has the factory system widened or narrowed the gulf between labor and capital? Explain. 2360
2. Describe labor conditions under the sweatshop system. 6948
3. Describe the conditions of labor in England in the last half of the eighteenth century. 3822, 3825
4. What is meant by "labor legislation"? 3822
5. In what country did modern labor legislation begin? 3822
6. When was the first factory act in England passed? What were its provisions? Describe the laws which were passed during the following century. What were the chief provisions of the laws? 3823
7. Why and how has labor legislation in the United States differed from that in Europe? 3823
8. Tell about the first outstanding decision on labor legislation by the United States Supreme Court. 3824
9. Describe the most important labor laws which have been passed in the United States. 3824
10. What are some purposes of labor organizations? What is the difference between trade-unions and associations? 3825
11. Discuss the criticisms which have been directed against trade-unions. 3825
12. What is sabotage? 6292
13. What is a strike? Define the following terms: Sympathetic strike, general strike, lockout, picketing, injunction. 6879
14. What is meant by open shop? 5213
15. What is a minimum wage? 4501
16. What is meant by collective bargaining? 1536

17. What was the Adamson Law? Under what stress was it passed? 35
18. What are labor banks? What have been their benefits? 3825
19. What do we mean by the term "workmen's compensation"? Discuss the problem of employer's liability. 2229-2230
20. What are the functions of the Department of Labor? 3831
21. What is the membership of the American Federation of Labor? 3825
22. Who was Samuel Gompers? Tell about his service to labor. 2868
23. What is the International Labor Organization? 3825

UNIT TWENTY

Exchanging Goods

Elements of the Unit

- A. Why We Exchange Goods.
- B. How We Determine the Value of Goods.
- C. How We Exchange Goods.
- D. How the Government Protects Us.

Questions, Problems, and Exercises

- A. Why We Exchange Goods.

References:

The Story of Commerce. 1582-1583

1. What does the word *commerce* mean? Distinguish between trade and commerce. 1582
2. What percentage of the goods you use do you produce yourself? What percentage is produced in your community? In your state? In this country?
3. List twenty-five articles you use, and indicate in a parallel column the place from which each comes.
4. Give some of the reasons why we buy and sell.
5. Show the relation between climate and the exchange of goods.
6. Why does specialization of industry stimulate the exchange of goods?
7. What effect did the Crusades have upon the exchange of goods? 1582

- B. How We Determine the Value of Goods.

References:

Supply and Demand. 6939

Value. 7447-7448

1. Read very carefully the article on *Value*. 7447-7448. What is value? What is price? Explain this statement: "There can never be a universal rise in values; but a universal rise in the prices of commodities is possible." 7447
2. What governs the value of a commodity? Be able to explain fully by giving illustrations. 6939, 7447
3. What determines the value of goods? 7448
4. Do air and sunlight have commercial value? Explain.
5. What is the labor theory of value? 7448
6. What does the economist mean by supply? By demand? Explain the relation between the two. 6939

7. What causes prices to go up and down?
8. How does advertising create a demand for goods? Does advertising affect the price of goods? Explain.

- C. How We Exchange Goods.

References:

Banks and Banking. 604-613

Barter. 631

Bimetallism. 740

Board of Trade. 808-810

Bullion. 1019

Check. 1323-1325

The Story of Commerce. 1582-1583

Credit. 1738

Letter of Credit. 1739

The Story of Economics. 2098-2099

Gresham's Law. 2063

Legal Tender. 3923

Mint. 4523-4525

Monetary Conferences. 4581

The Story of Money. 4582-4592

Weights and Measures. 7702-7703

1. How did primitive peoples exchange goods?
2. How important are weights and measures in facilitating the exchange of goods? Are weights and measures used among primitive peoples? 7702
3. How did men in early times estimate length and distance?
4. What is barter? What is the difference between barter and sale? Have you ever exchanged goods by means of barter? Do people in the United States to-day use barter as a method of exchange? Cite examples. 631; 1582
5. Is there any difference between the methods of exchanging products in rural communities and urban communities? Explain.
6. Who were perhaps the first merchants? Who were the greatest merchants of ancient times? 1582
7. What is money? 4582
8. Why is money such an important aspect of political economy? 2098
9. Do people use real money in buying and selling? Explain. 2098-2099
10. Does money itself have a price? Is it always worth the same? 4582

11. Did primitive man have use for money? Explain. 459¹
12. Name some of the things used as substitutes for money to-day and in the past. 459⁰
13. Give four reasons why standard metals have been chosen for the world's money. 458⁵
14. What is the unit of the monetary system of the United States? 458²
15. What has been the object of the four international monetary conferences? Is the object an important one? Is it becoming less or more important? Explain. 458¹
16. How long have people used money? 459¹
17. Explain the difference between standard coins and token coins. 458³-458⁶
18. What provisions does the United States government make to safeguard against counterfeiting or defacing money? 458⁶
19. What is Gresham's Law? 206³
20. What is meant by bimetallism? State the argument for and against this system. 74⁰
21. What is bullion? 101⁹
22. State briefly why credit is important in modern industry and commerce. 173⁸
23. What is a letter of credit? What are traveler's checks? 173⁸-173⁹
24. What is a check? Is a check money? Will a check buy goods and pay debts as well as gold? Explain. What precautions should you take in signing a check? What is the difference between "endorsement in blank" and "endorsement in full"? 132³-132⁵, 209⁹
25. Give arguments for and against the purchase of goods on the installment plan. 173⁸
26. Give two important functions of a bank. 604
27. How old is banking? What were the first bankers called? When did modern banking begin? Where? 606
28. Give a brief historical sketch of banking in the United States. 606-610
29. Be able to answer all the questions on banks and banking on page 611.
30. Have Christian people ever been forbidden to accept interest in return for the use of their money? 610
31. What is a mint? Do individuals have a right to coin money? 452³-452⁵
32. What is legal tender? 392³
33. How does the Board of Trade facilitate the exchange of goods? Explain. 808-810

RELATED SUBJECTS

Chamber of Commerce. 129⁸
 Chamber of Commerce of the United States. 129⁸-129⁹
 Free Trade. 2604

Balance of Trade. 576
 Exchange. 234²
 Trade Acceptance. 723³
 Bank of the United States. 602-603
 Bank of England. 601-602
 Clearing House. 1461-1462
 Fiat Money. 240⁵
 Bill of Sale. 740

D. How the Government Protects Us.

References:

Department of Commerce. 1583
 Commercial Law. 1584
 Counterfeiting. 1720-1721
 Denominate Numbers. 1898-1903
 Federal Trade Commission. 2390
 Fraud. 2600
 Interstate Commerce Act. 3490-3491
 Metric System. 4424-4427
 Standard Time. 6799-6800
 Trade-Mark. 7233-7234
 Weights and Measures. 7702-7703
 Wildcat Banks. 7761

1. What is the function of the Department of Commerce? 1583
2. How does the international metric system facilitate the exchange of goods between nations? 4426
3. Show the relationship between the exchange of goods and the Interstate Commerce Act. 3490-3491
4. What is commercial law? To what extent is it concerned with the exchange of goods? 1584
5. When you buy a pound of meat from the butcher, what assurance do you have that you receive a pound?
6. Ask your grocer or butcher how often his scales are inspected by government authorities.
7. Is a gold coin worth more because it has the government stamp on it? Is a silver coin worth more because of the government stamp? Explain.
8. What were the "wildcat" banks? Why is it necessary to have banking laws? 7761, 604-613
9. In what way does the government protect our bank savings?
10. What is counterfeiting? How is it punished? Why is the punishment so severe? 1720-1721
11. What is a trade-mark? May a trade-mark be registered in the Patent Office? How do trade-marks help you? 7233-7235

Supplementary Enterprises

1. How Primitive Peoples Exchange Goods.
2. Substitutes for Money. 4590
3. Foreign Monetary Units. 4589-4590, 4592
 (See reference for each monetary unit.)
4. How the Crusades Affected the Exchange of Goods.

5. Foreign Commerce.
6. The Effect of Advertising upon the Exchange of Goods.
7. Coins of Olden Times: Denarius, 1891; Drachma, 2018; Ducat, 2045; Florin, 2485; Obolus, 5140 and 1319; Pine-Tree

- Shilling, 5624; Talent, 7007; Wampum, 7389.
8. The Board of Trade. 808-810
9. The Story of Money. 4582-4592
10. Banks and Banking. 604-613

UNIT TWENTY-ONE

Communication

Elements of the Unit

- A. Early Modes of Communication.
- B. Telephone, Telegraph, Television, Radio, and Signaling.
- C. The Postal Service.
- D. The Newspaper.

Questions, Problems, and Exercises

- A. Early Modes of Communication.
References:
Code Writing. 1524
Cuneiform Inscriptions. 1784-1785
Hieroglyphics. 3175-3177
Language. 3858
Sign Language. 6601
Old and New Methods of Communication. 7061
Writing. 7898
1. What does *language* mean? 3858
2. How many different spoken languages (approximately) are there in the world today? 3858
3. What is meant by a grammarless tongue? 3858
4. What is picture-writing? What is ideographic writing? 3176
5. How did the Indians send messages? 7898
6. What are cuneiform inscriptions? 1784-1785
7. What is sign language? When was it used as the chief means of communication? 6601
8. Turn to the pictures entitled. *Old and New Methods of Communication*, on page 7061. Are all these methods in use to-day?
9. How long has code writing been practiced? 1524
10. Describe the attempts which have been made to create a universal language. 3869-3870, 7560, 2298
- B. Telephone, Telegraph, Television, Radio, and Signaling.
References:
Cable. 1060-1063
The Story of Radio. 5935-5968
Signal Corps. 6597-6598
Signaling and Signals. 6598-6601
The Story of the Telegraph. 7058-7066
Telephone. 7067-7080
Television. 7084-7087

1. Who invented the telephone? In what year? 7067
2. Read the article quoted from a Boston daily newspaper. Did you realize before that the telephone was such a recent invention? 7067
3. When were photographs first successfully transmitted by telephone? 7074
4. What does the word *telegraph* mean? 7058
5. Who invented the telegraph? When? 7058
6. Give one or two incidents illustrating the speed with which news can be spread throughout the world by means of the telegraph. Compare this with colonial days. 7058
7. How long does it take a telegram sent from New York City to reach Sydney, Australia, a distance of twelve thousand miles? 7058
8. How many miles of line are used for telegraph purposes throughout the world? 7058
9. Enumerate the ways in which the telegraph is being used to-day. 7059-7060
10. See the map on page 1062 for the principal ocean cables.
11. When was the first public demonstration of television made? 7087
12. What is meant by the statement: "The radio is shrinking the world."
13. Do all nations have the same signal for a call for help?
- C. The Postal Service.
References:
The Air Mail. 129-131
Dead-Letter Office. 1845
Postage and Postage Stamps. 5768-5770
International Postal Union. 5771
The Story of the Postoffice Department. 5771-5777
1. What is the origin of the word *post*? What does it mean? 5771
2. In what century was the postal service first used by private individuals? 5771
3. In what year was the first postoffice established? 5774
4. Is the United States postal service a money-making enterprise? 5772
5. How many postoffices are there in the United States? How many employees? 5772

6. How many letters does the United States postal service handle per second? Per minute? Per hour? Per day? Per year?
7. How many postage stamps are sold each year in the United States? 5772
8. What is the Dead-Letter Office? How many letters go to it each year? Why? Whose fault is it? Is this an additional expense imposed upon the government? 5772, 1845
9. What is meant by free delivery? 5774
10. What is the International Postal Union? What is its purpose? 5771
11. When was air-mail service begun in the United States? 129-130
12. In how much less time is a letter carried from coast to coast by air than by rail? 129
13. What is the present flying schedule between New York and San Francisco? Compare this time with the time required in 1850, 1860, 1876, and 1923. 130
14. How many people in the United States are directly reached by air-mail service? 131

D. The Newspaper.

References:

Advertising. 60-66
 Associated Press. 458
 International News Service. 3487
 Linotype. 4033-4036
 The Story of Newspapers. 4953-4958

1. What did Napoleon Bonaparte mean when he said, "Four hostile newspapers are more to be feared than a thousand bayonets." 4953
2. What means of communication does the newspaper depend upon? 4953

3. When and where were the earliest attempts made to circulate news? What kind of news did those newspapers contain? 4956
4. In what year was the first serial newspaper of modern style printed in Europe? In what country? 4956
5. In what year was the first newspaper in America started? Was it successful? 4957
6. What are tabloid newspapers? Describe a tabloid, and if possible, bring one to class. Are there any tabloids to-day of wide circulation?
7. What is meant by direct-mail advertising? Is this a modern method of communication between the producer and consumer? To whom is it most advantageous? Discuss. 62
8. What is the Associated Press? How many newspapers are included in its membership? 458

Supplementary Enterprises

1. Some Well-Known Newspaper Men. (See list of *Related Subjects*, on page 4958.)
2. Signaling and Signals. 6597-6601
3. Some Pioneers in the Development of Modern Means of Communication: Joseph Henry, 3147; Samuel F. B. Morse, 4664; Cyrus W. Field, 2408; Mathew Fontaine Maury, 4350; Marconi, 4287-4288
4. Code Writing. 1524
5. A Universal Language. 3869-3870, 7560, 2298
6. Laying Ocean Cables. 1060-1063
7. The Air-Mail Service. 5776-5777
8. Television. 7084-7087
9. The Radio. 5935-5968

UNIT TWENTY-TWO

Transportation of Goods and People

Elements of the Unit

- A. Early Modes of Transportation.
- B. Transportation by Water.
- C. Transportation by Land.
- D. Transportation by Air.
- E. The Government and Transportation.

Questions, Problems, and Exercises

- A. Early Modes of Transportation.

References:

The Story of the Automobile. 534-535
 Caravan. 1189-1190
 Cumberland Road. 1784
 Trails of Early Days. 7237-7239
 Transportation. 7246
 Transportation and Commerce. 7380-7385

1. Were there any horses in America before

the white man arrived? Did the Indians use wheels before the white man arrived? 3406

2. What were the principal modes of travel used by the American Indians? 3406
3. What is perhaps the oldest agency of travel? 6562
4. Read carefully the article on *Transportation*. 7246-7251
5. Read the first paragraph of the section on *Transportation and Commerce*. What change in conditions of life is largely the result of improved transportation? Has the change in the conditions of life resulted in improved transportation, or has the development of transportation resulted in these changes in our way of living? Discuss. 7380

6. Read page 534 and the first column of page 535. Does climate and geographical location affect modes of transportation? Explain. Describe the mode of transportation of the Serbian peasant. Are we, with our swift-moving automobiles, more contented than he?
7. What means of transportation was developed first in early colonial America, water or rail? 7381
8. What two means of transportation became the first bonds of union between the East and the West? 7380
9. When was the first railroad in the United States begun? How long was it? 7380
10. In pioneer days, what was the chief motive power for the transportation of goods and people? 7237
11. Discuss the three periods or stages of road-making mentioned on pages 7237-7238.
12. What eight pioneer trails are historically important for their influences in the development of early American life? 7258-7259
13. Could George Washington in his day travel more rapidly than Julius Caesar or King Solomon? Explain. 7246
14. Describe a caravan journey across the deserts of Asia or Africa. 1189

B. Transportation by Water.

References:

The Old-Time Canal. 1157-1162
 The Great Lakes Commerce. 2935
 Lakes-to-Gulf Waterway. 3845
 Leviathan. 3952-3953
 Merchant Marine. 4404-4406
 New York State Barge Canal. 4997-4998
 The Story of the Panama Canal. 5331-5337
 The Story of Ships. 6562-6570
 Suez Canal. 6903-6904

1. Which is more expensive, transportation by land or by water? Why? 7381
2. How long have navigation canals been in operation for purposes of transportation? 1158
3. Is transportation by canals now used extensively in the United States? 1159, 4998
4. What is the trans-Atlantic speed record for steamships? When was it made? 6564
5. Is interest in inland waterways increasing or decreasing? Discuss. 3845
6. How extensive is commercial transportation over the Great Lakes? 2935

C. Transportation by Land.

References:

The Story of the Automobile. 534-546
 Bicycle. 733-734
 Electric Railway. 2187-2190

- Lincoln Highway. 4022-4024
 Locomotive. 4076-4082
 Main Street of America. 4232-4233
 Monorail Railroad. 4599-4600
 Railroad. 5973-5984
 Bureau of Public Roads. 6139
 The Story of Roads and Streets. 6140-6145
 Subway or Underground Railway. 6897-6900
1. What has been the immediate cause of the universal demand for good roads? Explain. 7237
 2. What are some of the benefits of good roads? 6143-6144
 3. What is the annual expenditure for public roads? 6145
 4. How many passenger motorbusses are now in use in the United States? 7381
 5. What is the "Main Street of America"? 4232-4233
 6. What is the "Main Street of the United States"? 4024
 7. What was the automobile speed law which was enforced in England until 1896? 535
 8. How many people in the United States are employed on its railroads? 5980
 9. How many miles of rails are there in the United States? 3490
 10. How many tons of freight are carried by the railroads annually? How many passengers? 3490

D. Transportation by Air.

References:

The Story of Aircraft. 112-151
 The Story of the Balloon. 584-586
 Lindbergh, Charles A. 4025-4030
 Zeppelin, Ferdinand. 7972-7973

1. How long have men thought of the possibilities of flying? 113
2. What may be said to be the three stages in the development of flying? 113
3. Who invented the balloon? In what year? 113
4. What is the mechanical difference between a balloon and a flying machine? Explain. 584
5. Who were the first passengers to have a balloon ride? 584
6. What are some of the valuable uses of balloons? 115, 585
7. Is air navigation by means of balloons commercially significant to-day? 586
8. When did the first passenger Zeppelin reach America? 116
9. In speaking of lighter than air aircraft, what does "ZR" mean? 116
10. What happened to the *Shenandoah*? 116
11. How did America get its *Los Angeles*? 117
12. Who were two American pioneers in the field of aviation? 118-120

13. What is the Air Commerce Act? When was it passed? 130-131
14. Why has the development of commercial aviation, until recent years, been more rapid in Europe than in America? 129-131
15. How many air lines are in regular operation in the United States? 131
16. How many miles do the regular air lines authorized in the United States cover? What is the total approximate mileage covered in a year by all scheduled flights? 131
17. What university in this country offers a four-year aeronautical engineering course which leads to a "flying" degree? 132
18. Is it safe to travel by air? Base your answer on the facts found in *Safety of Air Travel*. 132
19. What is a seadrome? Describe one. 134
20. What are some of the values of rapid freight transportation? 134-135
21. Has air-passenger transportation been developed in Europe to any great extent? Discuss. 136-137
22. Tell about the trip of the first ocean air-liner. When was it made? How many passengers did the air-liner carry? Between what two points was the trip made? 137-138
23. When was the first flight around the world made? 140
24. Tell about Lindbergh's famous Atlantic conquest. 147-150, 4025-4030

E. The Government and Transportation.

References:

Common Carrier. 1585-1586
 Franchise. 2589-2590
 Interstate Commerce Act. 3490-3491
 Monopoly. 4599
 Municipal Ownership. 4743-4744
 Public Utilities. 5872
 Esch-Cummins Act. 5982
 Government Ownership and Operation. 5982-5984

1. What is a common carrier? 1585
2. Under what two obligations does the common law place the carrier? Are they regulated by statute law? 1585
3. Write a paper of one page explaining in your own words the responsibilities of carriers of goods and passengers. 1585-1586
4. What is the Interstate Commerce Act? Why was it passed? Has it been successful? What are some of the distinctive features of the act in its present form? 3490
5. What is the Interstate Commerce Commission? How many members are on the Commission? How are they appointed? What are the duties? 3490
6. What is the Esch-Cummins Act? What are its purposes? 5982
7. Does the government now own and operate any railroads? 5982
8. State the arguments for and against government ownership of railroads. 5983-5984
9. What is a monopoly? How does it apply to transportation? 4599, 4743-4744
10. What is meant by municipal ownership? Discuss the arguments for and against municipal ownership. 4743-4744
11. What is a franchise? Discuss fully. 2589-2590

Supplementary Enterprises

1. Great Pioneers and Heroes in Transportation: George Stephenson, 6828; Robert Fulton, 2634-2635; Samuel P. Langley, 3857; Orville and Wilbur Wright, 7896-7897; Charles A. Lindbergh, 4025-4030; Richard E. Byrd, 1053-1054.
2. Early Modes of Travel.
3. Modes of Travel in the Orient.
4. The Pony Express.
5. Travel in Colonial Days.
6. The Proposed Great Lakes Waterway.
7. Air Transportation.
8. How the Government Aids Transportation.

UNIT TWENTY-THREE

Thrift and Conservation

Elements of the Unit

- A. How Goods Are Wasted.
- B. Conservation of Natural and Human Resources.
- C. How We Can Help to Save.

Questions, Problems, and Exercises

- A. How Goods Are Wasted.

References:

Accident Prevention. 15-16
 Fire Losses. 2427-2428

Destroyers of the Forests. 2534-2536
 Income Distribution. 3373-3374

1. What percentage of the average family's income is wasted? (See expenditure chart, on page 3373.) If your family is an average family, how many dollars did it waste last year?
2. Review Element B, Losses from Fire, Accident, Crime, and Natural Disasters, in Unit Eight, The Community and Protection. Why should these losses be counted as waste?

3. It has been estimated that the chimneys in Chicago throw out nearly 180,000 tons of solid matter in a year. Does this represent a waste of natural resources? Explain. 6654, 6689
4. Is child labor wasteful? Explain.
5. Explain how unemployment is a source of waste.
6. Make a list of all the instances of wastefulness which you have seen in your home, school, and community.
7. What is a bargain? Is it sometimes wasteful to buy bargains? Explain.

B. Conservation of Natural and Human Resources.

References:

Alberta (Natural Resources; Irrigation). 185, 186-188

Government Protection of Birds. 766-770

Boulder Dam. 895-896

Child Labor. 1375-1376

Coolidge Dam. 1659

The Story of Conservation. 1622-1623

Dam. 1814

Elephant Butte Dam. 2202, 2203

The Story of Forests and Forestry. 2533-2541

The Story of Irrigation. 3553-3559

Minimum Wage. 4501-4502

Gifford Pinchot. 5619

Reclamation Service. 6022-6024

Natural Resources. 7368-7373

1. What is the meaning of conservation? 1622
2. What are natural resources? Name four. 1622
3. Has the United States government been active in conserving natural resources? Tell the history of the conservation movement. 1623
4. How is fire prevention related to conservation?
5. Tell about the work of the government in protecting birds. 766-770
6. How many acres of forests are destroyed annually by fire? What is the annual loss of forests from the ravages of forest insects? 2534, 2536
7. How much forest is consumed in one issue of a great city Sunday newspaper? 2536
8. Is America consuming forest lands faster than they are being grown? Discuss. 2538
9. What country has been a leader in forest conservation? 2538
10. Should the government be as interested in the conservation of human life as in natural resources? Explain. What does the government do to conserve human life?
11. In what way does legislation requiring safety appliances and sanitary conditions

in places of employment conserve human resources?

12. How do minimum wage laws conserve human resources? 4501-4502
 13. What is irrigation? Is it a recent development? Discuss. 3553
 14. Tell about the development of irrigation in the United States. 3553-3558
 15. What is the purpose of the United States Reclamation Service? 6022-6024
- #### C. How We Can Help to Save.

References:

Savings Banks. 610-613

Thrift. 7160-7162

1. What is the meaning of thrift? 7161
2. Why should we avoid waste? Is it true that the more we waste the more we must work? Answer in terms of your understanding of wealth, work, utility, capital, supply, demand, and goods.
3. Is thrift a virtue, as love, loyalty, and sympathy are? Explain.
4. Explain Cicero's statement: "Economy is of itself a great revenue."
5. Explain this old Latin proverb: "No gain is more certain than that which proceeds from the economical use of what you have."
6. Read carefully the statements on thrift made by Simon W. Straus, Lord Rosebery, and Woodrow Wilson. Which statement do you like best? Why? 7161
7. Describe what is being done in America to promote thrift. 7161-7162
8. Have you ever made a budget for your own expenditures? Try it.
9. What are school savings banks? Do you have one in your school? 613
10. What can you do to help save natural resources?
11. How can you help save your own "human resources"?
12. Is time valuable? How much of it do you waste? Do you have a schedule which you follow in preparing your school work? If not, "budget" your time and follow the plan regularly. Report your experiences to the class.
13. List all the ways in which an individual may be thrifty without being "stingy."

Supplementary Enterprises

1. The Conservation of Natural Resources. 7368-7373; 1622-1623
2. The United States Reclamation Service. 6022-6024
3. Large Dam Projects in the United States, 895-896, 1814, 390, 3341, 3766, 3767. 4751-4753, 1659, 2202, 2203
4. The Conservation of Human Resources.
5. Evidences of Waste in My Community.
6. An Ideal Family Budget.

Part Five. Occupations

UNIT TWENTY-FOUR

Choosing a Vocation

Elements of the Unit

- A. Why We Need to Work.
- B. How To Choose One's Work.
- C. How To Prepare for One's Work.

Questions, Problems, and Exercises

References:

Ambition. 244-246

Industry. 3445-3446

The Story of Manual Training. 4270-4272

Technical and Industrial Education. 7052-7053

The Story of Vocational Guidance. 7551-7555

Determination of Vocational Aptitudes. 7555-7559

1. Why do we need to work? Why do we have to work for some things and not for others?
2. Should everyone work who is physically and mentally able? Why? Discuss this statement: "There are two classes of social parasites: the hobos and the idle rich."
3. Approximately how many young people each year face the problem of choosing and entering an occupation? 7555
4. List five occupations that help to satisfy your daily wants. Name five which contribute in no way to fulfilling your desires. Are the latter *unproductive* occupations? Explain.
5. Name five new occupations which have originated within the last ten years.
6. Explain this statement: "It takes all kinds of people to make up this world." 7551
7. What is meant by the expression, "Jack-of-all-trades"?
8. Do you think most people can do several things equally well, or is there "one best vocation for each individual"?
9. Why is the choice of an occupation more difficult to-day than ever before? 7551
10. Should one choose a highly specialized vocation early in life, perhaps while one is still in high school? Give reasons. 7551
11. Discuss two purposes of vocational guidance. 7551-7552
12. What is the meaning of *vocational aptitudes*? Why has there been but little concern over vocational aptitudes until recently? What change in our industrial life has created a need for the study of qualifications for a particular job? 7555
13. How do physical and economic factors sometimes hinder one from entering the occupation of his choice? 7556-7557
14. Discuss three things which a boy or girl may do to become acquainted with various occupations. 7552
15. Which is more difficult to analyze and understand, the occupations of the world or the human beings in it? Explain. 7552
16. What is the best method of learning about vocations? Is this always possible? 7552; 7555
17. Is intelligence the most important factor in determining success in an occupation? Discuss. 7557
18. What occupations, according to the chart at top of page 7557, require the highest intelligence? The lowest?
19. Do some people have too much intelligence for their jobs? Explain. 7557
20. Name and discuss three aptitudes other than physique and intelligence which have vocational value. 7557-7558
21. In choosing a vocation, should you depend entirely upon the advice of your parents, teachers, and friends? Why? 7554
22. What is a "blind-alley" job? 7554
23. Read carefully the suggestions found at top of page 7555.
24. Describe the provisions made in the public schools for vocational guidance. 7552, 7555-7556
25. Choose a vocation in which you are interested, and evaluate it by means of the score card on pages 7553-7554. After you have studied the vocation, study yourself in relation to it. Answer all the questions in the score card on page 7554. Did the vocation prove to be a good one? Are you qualified to pursue it?
26. Interview twenty-five working people, and ask them whether or not they are satisfied with their work. Formulate ten or fifteen questions to ask in your interview. Try to discover their fitness for their occupations by keeping in mind the two score cards on pages 7553-7554. Report your results to the class.
27. Make a Career Book. First choose an occupation in which you are interested. Then find out all you can about it through reading, observation of men on the job, and interviews. Next evaluate the vocation by means of the score card found on page 7553. Discuss each item at length. Complete your study with an analysis of your own characteristics and aptitudes. Consult the score card on page 7554. Put the material together in an attractive booklet entitled "My Career Book."

UNIT TWENTY-FIVE

Making a Living

Elements of the Unit

- A. Agriculture.
References:
 Agricultural Education. 88-90
 Agricultural Experiment Station. 90-91
 Agricultural Extension Work. 91
 The Story of Agriculture. 92-104
 Agronomy. 106-107
 The Story of Boys' and Girls' Clubs. 903-908
 Breeding. 940-941
 The Story of Canning Clubs. 1172-1173
 Cattle. 1250-1258
 Dairying. 1807-1811
 Dry Farming. 2042-2044
 Farmers' Institute. 2371
 The Story of Gardening. 2683-2687
 Horticulture. 3255
 Intensive Farming. 3473-3474
 The Story of Irrigation. 3553-3559
 Landscape Gardening. 3854-3855
 The Story of Poultry. 5787-5790
 Rotation of Crops. 6213-6214
 Wealth in Farms. 7373-7377
- B. Forestry and Lumbering.
References:
 The Story of Forests and Forestry. 2533-2541
 Lumber. 4145-4153
 The Story of Trees. 7258-7261
- C. Mining and Oil Refining.
References:
 The Story of Coal. 1497-1507
 The Story of Conservation. 1622
 Copper. 1666-1669
 Diamond. 1928-1933
 Gold. 2855-2860
 Minerals and Mineralogy. 4498-4500
 The Story of Mining. 4502-4508
 Petroleum. 5520-5529
 Quarry and Quarrying. 5904-5906
 Salt. 6340-6344
 Silver. 6613-6614
 Utah (Mining). 7432-7433

D. Fishing.

References:

The Story of Fishes. 2440-2445
 Salmon. 6333-6339
 Whale. 7726-7730

E. Building

References:

The Story of Architecture. 359-368
 Brick and Brick-Laying. 945-946
 Bridge. 948-953
 Brooklyn Bridge. 976
 Building. 1009-1011
 Carpentry. 1207-1211
 Concrete Construction. 1598-1600
 The Story of Engineering. 2237-2242
 The Story of Invention. 3493-3500
 The Story of Iron and Steel. 3534, 3551
 Plumbing. 5663-5664
 Surveying. 6943-6944
 Wood Carving. 7829

F. Manufacturing Goods.

References:

Books and Bookbinding. 851-858
 Boots and Shoes. 861-862
 Cloth. 1489-1491
 Costume. 1706-1708
 The Story of Dress. 2033-2036
 Electroplating. 2195
 Engraving. 2272-2274
 Factory and Factory System. 2359-2360
 The Story of Iron and Steel. 3534-3550
 Lithography. 4054-4055
 Photo-Engraving. 5579
 Printing. 5817-5820
 Printing Press. 5820-5823
 Standardization in Industry. 6797-6798
 Textile. 7130-7132
 Weaving. 7693-7695

G. Transporting Goods and People.

References:

The Story of Aircraft. 112-151
 The Story of the Automobile. 534-546
 Electric Railway. 2187-2190
 Locomotive. 4076-4082
 Navigation. 4840-4841
 Railroad. 5973-5984
 The Story of Ships. 6562-6570
 Transportation. 7246-7251

H. Commercial and Clerical Occupations.

References:

Accounting. 17-18
 Advertising. 60-66
 The Story of Banking. 604-613
 Bookkeeping. 838-850

Chain Stores. 1295
 Department Store. 1910-1911
 Shorthand Writing. 6572-6574
 The Story of the Telegraph. 7058-7066
 Telephone. 7067-7080

I. Working for the Government.

References:

The Story of the Army. 412-417
 The Story of Civil Service. 1449-1452
 Coast Guard. 1509-1514
 Fire Department. 2429-2433
 Marine Corps. 4292-4293
 Military Academy. 4475-4477
 Naval Academy. 4835-4839
 Navy. 4842-4851
 Police. 5701-5702
 The Story of the Postoffice Department.
 5771-5777
 Secret Service. 6477-6478

J. The Professions.

References:

Dentistry. 1903-1905

Druggist or Pharmacist, 2039
 Law. 3897-3899
 Medical Schools. 4372-4373
 The Story of Newspapers. 4953-4958
 Story of the Opera. 5213; 5225
 The Story of Painting. 5299-5308
 Schools for Teachers. 6426-6427
 The Story of Sculpture. 6455-6462
 Theater. 7136-7140

K. Home-Making.

References:

The Story of Cookery. 1649-1650
 Costume. 1706-1708
 Domestic Art. 2003-2009
 Food. 2508-2513
 Preservation of Food Products. 2514-2519
 The Story of Home Economics. 3205-3210
 The Story of Household Arts. 3262-3264
 The Story of Industrial Art. 3433-3444
 Interior Decoration. 3478-3482
 Nutrition. 5121-5126
 Sewing. 6514-6519
 Sewing Machine. 6519-6520



GENERAL SCIENCE

BY

Fred G. Anibal, John C. Mayfield, Bertha M. Parker

Introduction

In this section there are presented twenty-two units in natural science. Each unit consists of a block of material, all of which relates directly to one central idea. This group of units may serve as a syllabus for a one-year course in general science such as is commonly taught in public schools, but preferably should be a basis for a three-year course. The material has been selected and organized for the use of pupils in the upper grades of the elementary school, the junior high school, and the earlier years of the senior high school before the special sciences are introduced as organized courses. The easier units have been placed first, and those which require more mature thinking are placed last. The units have been prepared for use independently, so it is not necessary that they be taken up in the order in which they appear.

It is not presumed that this material covers the whole field of general science. Significant and interesting aspects of the everyday world with which we are constantly in touch have been selected and organized. The scientific importance of each point which is included has been developed and explained as it relates to the other factors and to the general meaning of the unit as a whole. Many more units could be selected and organized, as the field of elementary science is exceedingly fruitful, and the material contained is intensely interesting and significant in a modern scientific age.

Each block of material is organized in accordance with a plan which is consistent throughout the section. At the beginning are listed the main understandings. This list of understandings does not represent the outline of the matter treated in the body of the unit. The separate ideas listed here express the entire content of the unit in very concise statements. A study of the material in the body of the unit is intended to furnish the learner with

a background for a full understanding of the significance of each idea stated here as a main understanding. For the teacher using this material, these statements are the concrete aims for the study of the unit.

A story introduces each unit. The purpose of this story is to prepare the way for a more detailed study of the references listed later. This presentation story serves to bind all of the ideas together and to stimulate further investigation by calling attention to the significant and interesting features of science which are more fully explained on the pages indicated in the references. The story is not intended to take the place of the subject matter of any science textbook. It is a bare framework, to which are to be added the many and extensive ideas which are gained as a result of more extended study.

The main body of the unit is the Study Outline. The material is here arranged in a logical order under appropriate headings to facilitate study. Questions are placed in this division for the purpose of giving definite guidance for the study of the articles contained in the main body of this encyclopedia. It is felt that this type of study will result in a better grasp of the material than reading without there being definite points in the reader's mind to be cleared up. As far as possible, questions which can be answered by 'yes' or 'no' have been avoided. In a great many instances, definite page references to *THE WORLD BOOK* have been given after a question. The answer to that question is to be found on that page. Where no page reference is given, the answer is included either in the material referred to for the answer to the previous question or in the general references at the beginning of that particular section.

Following the Study Outline is a Things To Do section. Here are included projects, problems, games, and puzzles, all dealing directly with the material of the unit. After a study of

the unit, the reader can test his ability by trying to do the things suggested in this section. This part is, in a sense, an extension of the unit for the benefit of the reader who cares to go further with the study of the ideas introduced before. Answers to the less obvious puzzles and problems are added so that the reader can check up on his accuracy.

The units may be made use of in three ways: (1) for independent study, (2) by a pupil in conjunction with his regular school work, and (3) by a teacher in preparing material for a class of pupils in general science.

The content material of these units is drawn from a field which is of tremendous importance to anyone who desires to know more about the scientific significance of his surroundings. All of the problems are problems of everyday life. Constantly are we brought into contact with the workings of natural science. A systematic study of this field will be of real value to one who has never had the opportunity to take courses dealing with science. The organization is well suited for the person who desires to study independently. The introductory story presents the general idea of the whole unit. The Study Outline can be easily followed, as it is arranged logically. The questions bring out the interesting and important points to be found in the references to which the reader is directed. The last section furnishes an excellent type of test and a means of making use of the science information which has been gained.

The alert pupil who is studying general science as a regular school subject either in the elementary school or in the high school will find a wealth of organized material in these units which will be a constant help in understanding the regular course. The Things To Do section is full of suggestions for interesting projects, both very simple and more extensive. In many cases, the units are identical with the

units in the regular school course, as far as general ideas are concerned, and much additional interesting reference matter can very quickly be located by turning to the pages indicated.

The teacher will find the organization of the material very helpful. The units are the result of actual class-room experience and have proven successful. The main understandings at the beginning of each unit are the unit objectives. The presentation stories make convenient introductions to similar units, even though the text-book organization of the unit may differ from the one offered here. Much valuable enrichment material is contained in the Things To Do sections at the end of each unit. Here will be found suggestions for the faster workers who desire additional work and care to undertake projects. Both very simple and quite extensive problems and projects have been included. Puzzles and interesting class exercises and games will be found here which will make the general science course intensely interesting and instructive. The reference material has been carefully selected to suit the abilities of general science pupils. It can easily be read and understood by elementary-school pupils. The units may be used in whole or in part, and since each unit is complete in itself, it is not necessary to take into consideration the units which may precede it in the order presented here.

It is hoped that the use of this material will stimulate both the pupil and the teacher, and will lead to further exploration into the field of natural science. This whole section of organized material barely touches the surface. There is a wealth of material in *THE WORLD BOOK* alone, and Nature is continually presenting new and more interesting problems. Once started, the investigations into Nature's secrets will be an absorbing pastime which will yield valuable returns.

UNIT ONE

Rocks as Records of the Earth's History

Main Understandings

1. The earth is very old, and its history is a history of great change.
2. Rocks furnish the sole record of the history of the earth before the age of man.
3. Different kinds and arrangements of rocks tell different chapters of the story of the earth.

Stories the Rocks Tell Us

Imagine for a moment that the clock of the ages has been turned back so that you have a glimpse of the earth as it was at one time in the Age of Reptiles, many millions of years ago. You notice at once the great reptiles roaming about. The growls of some of them may frighten you; no wonder, for one of these reptiles is the greatest flesh-eating animal of

all time, an ugly beast nearly forty feet long, with huge jaws filled with sharp teeth. Many of the reptiles you see, however, are placid, plant-eating animals. Some of the land plants may look familiar, but many are strange to you.

In our imagination, let us take an even longer trip into the past and see the earth as it was a few hundred million years earlier. How much sea there is; much of the dry land of modern

times is covered by it! At the water's edge there are starfish, mollusks with shells fifteen feet long, trilobites, and many other marine animals which have no common names because they lived and died millions of years before there were any people on earth to name them. No matter where you look, you find no trees or grass or flowers. Indeed, much of the land is bare rock. No animals scamper over the rocks, and no birds fly overhead. Not a sound do you hear but the roar of the waves, the rustle of the wind, and the rolling of an occasional rock down hill. The animals themselves make practically no noise; no animal with a voice has yet appeared on earth. A queer world indeed compared to the world of to-day!

Even if you turn the clock of the ages back to this time of long ago, you are not turning it back to the time when the earth was new. The earth was already many, many million years old.

How, you may wonder, do we know about the earth as it was millions of years ago? No people lived to leave records during the Age of Reptiles or before that time. The answer is that scientists have learned to read the story of the earth from the rocks. They have found in the rocks many fossils, which are traces of the plants and animals of long ago. They know where the old seas and lakes used to be by studying the rocks. These rocks show that some regions of the earth have sunk below the water and have risen from the water time after time. Scientists have found out about volcanoes and lava flows of long ago by finding volcanic rocks. Rocks show that there have been great mountain ranges where there are no high mountains now, and that there are mountains now where there were no mountains a few million years ago. Rocks tell, too, that there have been changes of climate—that there have been times when the heat-loving magnolias of the south grew as far north as Greenland, and other times when great ice sheets covered millions of square miles of what is now cultivated land. Forest regions have changed to deserts, and deserts to forest regions, according to the records of the rocks.

Rocks have not told us all that we should like to know about the earth's history (probably they will never be able to do so), but day by day scientists are finding out more about the story of the earth before men lived here.

If you are interested in the story the rocks tell, you will find much more about it in the volumes of *THE WORLD BOOK*. In some of the many articles you will see that names are given to different periods of the earth's history. It is not important for you to try to remember these names. The story of the earth is so long that scientists have divided the time that it covers into periods and have given these

periods such names as Ordovician, Permian, and Triassic.

Study Outline

[Numbers refer to pages in *THE WORLD BOOK Encyclopedia*. Articles starred (*) are to be read in full.]

I. **Our Changing Earth.** See *THE STORY OF GEOLOGY* (Nature and Scope of Geology, 2732; Work of the Atmosphere, 2732-2733; Work of the Hydrosphere, 2733-2734; The Work of Plants and Animals, 2734; Earth Movements and Volcanoes, 2734; Mountains and Plateaus, 2737); *EARTHQUAKES**, 2084-2086; *FAULTS*, 2382; *VOLCANO*, 7560-7564; *GLACIERS*, 2820-2822; *GLACIAL EPOCH*, 2817-2819; *ORDOVICIAN PERIOD*, 5242; *PERMIAN EPOCH*, 5490-5491.

1. "Geologists find the clue to what has taken place in the past by observing the forces now at work in changing the surface of the earth." What forces are now at work changing the surface of the earth? 2732-2734
2. If rivers are constantly carrying material to the sea, why does not the earth become a shoreless ocean? 2732
3. Is the land rising anywhere at present? 2734
4. Why isn't "burning mountain" a good name for a volcano? 7562
5. What is an active volcano? An extinct volcano? 7563
6. Can lava come only out of a mountain? 2560
7. How are mountains made? 2737
8. How was the mountain shown in the illustration on page 7561 probably made?
9. What changes do earthquakes make in the earth's surface? 2084
10. What is a fault? 2382
11. How did the Greeks explain volcanoes? 2742
12. In what sorts of places may glaciers be found to-day? 2820
13. What are crevasses? 2820
14. How can the movement of a glacier be measured? 2822
15. What does a glacier do to the regions over which it passes? 2822
16. Are all glaciers like rivers of ice? 2822
17. Can trees grow on glaciers? 2822
18. Has the part of North America which is now dry land always been dry land? 5242

19. Will there ever be another ice age? 2819
20. What are some of the great changes which took place in the period of the earth's history called the Permian Epoch? 5491, 2741

II. The Book of the Earth. See THE STORY OF GEOLOGY (The Book of the Earth, 2732; Reading the Rocks, 2737-2738; Duration of Eras, 2738); HIEROGLYPHICS, 3176.

21. What are the "pages" of the earth? 2732
22. How long has the earth book been in the making? 2738
23. What is the "geologic column"? 2738
24. Probably scientists will never be able to read the complete story of the earth from the rocks. Why? 2732, 2338
25. We do not need rocks to tell us the story of important changes after men began keeping records of such changes. What is the probable date of the earliest known writings of man? 3176. Must rocks tell the larger or the smaller part of the story of the earth?

III. Reading the Book of the Earth.

A. Rocks Which Tell Us of the Lakes and Seas of Long Ago. See SEDIMENTARY ROCKS*, 6479; LIMESTONE, 4007; ORDOVICIAN PERIOD, 5242; DEVONIAN PERIOD, 1925; TRIASSIC PERIOD, 7266-7267; SHALE, 6538-6539; STRATIFIED ROCKS, 6875; DIP, 1954.

26. Of what is limestone made? Sandstone? Shale? Conglomerate? 6479
27. How are these rocks usually arranged? 6479, 6875
28. Acid is used as a test for limestone. What happens when acid is dropped on limestone? 4007
29. Chalk and coral are made of what? 4007
30. How was marble formed? 4007
31. Knowing how limestone is made helps you to read what story from a layer of limestone?
32. What do the thick layers of limestone mentioned on page 7267 tell?
33. What can you tell about the county Devon region during the Devonian Period? 1925

34. What rock especially tells of the submergence of great areas of North America in the period called the Ordovician? 5242
35. What is slate? 6539
36. Do all layers of rock lie in a horizontal position? Explain your answer. 1954
37. The diagram on page 2739 shows one way in which mountains are made. Notice the layers of rock.

B. Rocks Which Tell Us of Volcanoes and Lava Flows of Long Ago. See LAVA*, 3895-3896; TRIASSIC PERIOD, 7267; BASALT, 632-633; IGNEOUS ROCKS, 3347; GRANITE, 2898; CRYSTALLINE ROCKS, 1765; DIABASE, 1927; OBSIDIAN, 5146.

38. What does lava form when it cools? 3895
39. Find, from the references given above, the names of five rocks which tell scientists about the volcanoes and lava flows of long ago.
40. Does lava always reach the surface when it is forced up? 3896
41. How would you account for finding granite between layers of sedimentary rocks? 3896.
42. How were the Palisades along the Hudson River made? 7267
43. Of what rock are the Palisades made? 633
44. How do we know that there were great lava flows long ago in Northwestern United States and in India? 633
45. When were the crystals formed in granite? 1765
46. What is peculiar about the volcanic rock, obsidian? 5146
47. What are the three minerals commonly found in granite? 2898

C. Fossils and the Stories They Tell.

See DINOSAURIA*, 1948-1952; FOS-SIL*, 2548-2550; ICHTHYOSAURUS*, 3336; IGUANODON, 3348-3349; MAMMOTH*, 4243; MASTODON*, 4338; PTERODACTYL*, 5869-5870; EVOLUTION (Conclusions from Fossils), 2338; GEOLOGY (The Book of the Earth), 2732; GLYP-TODON, 2846-2847; HORSE (Evo-lution and History), 3243, 3246.

48. What are fossils? 2548, 2338

49. Have there always been animals with backbones on the earth? 2550, 2338
50. How can you account for the finding of fossils of sea animals in the rocks on land? 2549
51. Does it surprise you that the fossil fish pictured on page 2550 was found embedded in limestone? Why or why not? 2548
52. What would finding fossils of sea animals in the rocks of a region tell about that region?
53. How do we know that there once lived such an animal as the glyptodon? 2847
54. Can we tell the whole story of the plants and animals of long ago from fossils? 2338
55. Fossils of what kinds of animals are found in the oldest rocks containing fossils? 2338
56. In what kinds of rocks would you look for fossils? 2338, 2548
57. On page 2735 there are eight illustrations, all but one of which are pictures of fossils. Which one is not a fossil?
58. The diagram on page 2739 shows that the first-known traces of fishes were found in a layer of rock lower than that in which the first-known traces of birds were found. How do you account for this?
59. What does the word "dinosaur" mean? 1948
60. What proofs do scientists have that dinosaurs really lived? 1948
61. Which of the following statements is true? 1948
All dinosaurs were very large.
All dinosaurs were very ferocious.
All dinosaurs had heads which were very small in comparison with the sizes of their bodies.
62. What evidence do you get from the picture on page 1948 that such a skeleton as that shown on page 1949 is difficult to assemble?
63. Why must the picture on page 3336 be labeled as the "supposed" form of the ichthyosaurus?
64. What impresses you as being the most interesting fact about the iguanodon? 3348-3349

65. Are we more or less sure of how the mammoth looked than of how the dinosaurs looked? 4243
 66. At what time did the mammoths live? 4243
 67. What other extinct animal was very much like the mammoth? 4338
 68. How do you account for the fact that no common name is given for the pterodactyl? 5870
 69. What do fossils tell about the horse? 3243, 3246
- D. The Story of Coal.** See COAL (The Story of Coal, 1497-1498; Proof of the Origin of Coal, 1498); CARBONIFEROUS PERIOD, 1194; GEOLOGY (The Story by Eras), 2741.
70. How long ago is the coal age supposed to have been? 1498
 71. How was coal made? 1497
 72. How can coal be rightly called "buried sunshine"? 1497
 73. How can scientists tell how coal was formed? 1498-1499
 74. Why do we find coal in veins? 1497
 75. Coal was formed chiefly of what plants? 2741, 1194
 76. What animals were on the earth during the great coal age? 1194
- E. The Great Ice Age.** See GLACIAL EPOCH*, 2817-2819; MORAINES*, 4647; GLACIERS, 2822; THE STORY OF GEOLOGY (The Story by Eras), 2741.
77. Was the region where you live covered by ice during the great ice age? 2818
 78. How thick was the ice sheet which covered Northern North America during this Glacial Epoch? 2818
 79. Did the ice sheets advance only once? How was this discovered? 2818-2819
 80. About how much of North America was covered by ice sheets at the time of their greatest extent? 2818
 81. What animals were common at that time? 2819
 82. What did the glaciers leave to prove that there was a great ice age? 2818
 83. What is a terminal moraine? 2818, 2822

84. What is glacial drift? 2818
85. What marks do glaciers leave on rocks? 2822
86. How do the terminal moraines left by the glaciers of the great ice age look now? 4647
87. Did man live on the earth during this glacial epoch? 2819
88. Has there ever been an ice age in Southern continents? 2741

Things to Do

1. Make plasticine models of some of the animals of long ago. The pictures on pages 1948-1952 will be very helpful.

2. Draw in color a picture similar to the one on page 7561. Color the hot lava red.

3. Start a rock and mineral collection. Prepare a box for your collection.

4. Make alum crystals in this way: Heat a cupful of water in a pan. As soon as the water boils, remove it from the fire, and add powdered alum to the water, little by little, until no more will dissolve. Put in the solution a string on which the crystals may form. Stand the solution aside to cool. It should cool slowly. Examine the resulting crystals. Are they all the same shape?

5. A Puzzle: Jumbled Letters.

(1) N D O A S R U I

(2) E D P A R S L F

(3) S E A R O M I N

(4) D I S B O N A I

(5) M T O O A D S N

Arrange the letters in (1) to spell the name of an animal of long ago.

Arrange the letters in (2) to spell the

name of one of the minerals in granite. Arrange the letters in (3) to spell the name for hills of rock rubbish left by glaciers.

Arrange the letters in (4) to spell the name of a volcanic rock sometimes called "volcanic glass."

Arrange the letters in (5) to spell the name of extinct animals somewhat like elephants.

6. Imagine you have turned the clock of the ages back to the great ice age; tell what you would see.

7. Draw a picture to give an idea of the depth of the ice sheets during the great ice age, as compared with our highest skyscraper.

8. Put a drop of weak hydrochloric acid on a piece of limestone. Notice the bubbles which arise. Test chalk and coral in this way.

9. Put a few drops of water on a piece of shale. Notice the smell. Do all rocks smell like mud when wet?

10. The accompanying diagram, first illustration, tells the beginning of the story of how coal was made. Plants, among them giant rushes, are growing in a swamp.

The second diagram shows the next step in the story. The others should continue the story, and show why coal is found deep in the ground.

Answers:

5. (1) D I N O S A U R

(2) F E L D S P A R

(3) M O R A I N E S

(4) O B S I D I A N

(5) M A S T O D O N

UNIT TWO

Magnets

Main Understandings

1. There are two kinds of magnets: permanent magnets and electromagnets.
2. All magnets attract iron and steel.
3. Magnets have poles. Unlike poles attract each other; like poles repel each other.
4. The earth acts as a huge magnet with magnetic poles.
5. Electromagnets are much more important than permanent magnets, because their magnetism can be controlled absolutely by manipulation of the electric current.

The Magic of Magnets

Probably you have played with small horse-shoe magnets and have found out many things about magnets by doing so. You doubtless know that with one of these magnets you can pick up small bits of iron and steel, and that the magnet holds these bits until you shake or pull them off. You may have learned, too, that the force of a magnet extends for some distance from it; that a nail becomes a magnet when it is touching a magnet; that a magnet will act through materials such as paper, wood,

and glass, which it does not attract; and that with one magnet you can make other magnets. Perhaps from experiments with two magnets you have discovered how magnets act toward one another.

The horseshoe magnets which are common toys are permanent magnets, that is, they keep their magnetism for a long time. Permanent magnets need not be horseshoe shaped. Indeed, the most useful permanent magnets are straight, not bent. These most useful permanent magnets are the needles of compasses.

If you have read Rudyard Kipling's "Puck

of Pook's Hill," you surely remember that the voyages of Witta the Dane were guided by a "wise iron" which pointed always to the south, and that Witta explained its action by saying that there was an evil spirit in the iron which strove night and day to return to the country in the south from which it had come. Of course, you understand that the "wise iron" was merely a little permanent magnet fastened in such a way that it was free to act as a compass. In the early days of compasses, before scientists had discovered that the earth is a huge magnet which pulls a compass needle into a north-south position, people may well have thought that sorcery had something to do with the way a compass needle works.

We who live in this age of electricity are far more likely to be amazed at other things magnets can do than at the way compasses act. It does seem almost like magic to see a magnet lift a load of twenty thousand pounds of iron and drop it at the exact time and place the operator wishes. Lifting red hot blocks of steel, breaking up scrap iron by dropping a huge pear-shaped iron weight called a "skull-cracker" on it, removing bits of iron and steel from wheat which is to be ground into flour, unloading barrels of nails and heavy machinery, separating scraps of iron and steel from scraps of other metals, and sweeping up the bits of steel at the end of a day's work in a needle factory are other tasks that these modern magnets are called upon to do. It is not to be wondered at that magicians find them useful in some of their tricks.

The magnets which are among the marvels of to-day are not permanent magnets, but electromagnets. In many ways they are like the little permanent magnets with which you are familiar. As you may guess from its name, however, an electromagnet is a magnet only when a current of electricity is flowing through its wires. As soon as the current of electricity is shut off, it loses its magnetism.

At first thought it may seem that a magnet which loses its magnetism as soon as the current is shut off would be less useful than one which keeps its magnetism. But think for a moment of how little use a magnet would be which could lift ten tons of iron but could not be made to drop its load.

No permanent magnet, moreover, can lift as much as a powerful electromagnet.

Another advantage of an electromagnet is that its strength can be regulated. The same big lifting magnet which lifts six steel rails in one load can be used to lift only one rail as its next load. This is done merely by changing the strength of the electric current. How efficient a servant an electromagnet may be is shown by the fact that, in a test, a wagon which was loaded by two men in four hours

was unloaded by one man with an electromagnet in two minutes and a half.

Even if the electromagnet were useful only in the ways which have been mentioned, it would rank as an important invention. Only a very small part of the story of the importance of the electromagnet, however, has been told. More important by far than the uses which have been mentioned are its uses as parts of other electrical devices. Motors, generators, bells, buzzers, telegraph sounders, and radio loud-speakers are among the pieces of electrical apparatus which are built partly of electromagnets. In fact, so many of our very valuable electrical devices contain electromagnets that the electromagnet is called, in one volume of this encyclopedia, the "foundation of nearly all the great electrical inventions."

Study Outline

[Numbers refer to pages in THE WORLD BOOK Encyclopedia. Articles starred (*) are to be read in full.]

I. Kinds of Magnets. See ELECTROMAGNET*, 2193-2194; MAGNET AND MAGNETISM*, 4216-4218.

1. What kind of magnets were the first magnets? 4216
2. How did magnets get their name? 4216
3. What is "lodestone"? 4216
4. What is the best material for permanent magnets? 4217
5. How can permanent magnets be made? 4217
6. What is the chief advantage of an electromagnet over a permanent magnet? 2194
7. Who invented the electromagnet? 2193
8. Of what is the core of an electromagnet made? 2193

II. How Magnets Act. See MAGNET AND MAGNETISM*, 4216-4218; ELECTROMAGNETISM, 2194-2195; ELECTROMAGNET, 2193-2194.

9. What materials other than iron and steel do magnets attract? 4216
10. What are the ends of a magnet called? 4217
11. What is the advantage of making a magnet horseshoe shaped? 4217
12. What is the law of the poles? 4217
13. What parts of magnets are strongest? 4217
14. Why is one pole of a magnet marked N and the other S? 4217
15. What is a magnet's magnetic field? 4217
16. What does Fig. 2 on page 4217 show? 4217
17. What happens when the current is shut off from an electromagnet? 2194

18. How could you change the poles of an electromagnet? 2195
19. Sometimes the steel of watches becomes magnetized. How can a magnetized watch be demagnetized? 2195

III. The Earth as a Magnet. See MAGNET AND MAGNETISM (The Earth's Magnetism), 4218.

20. Where is the earth's north magnetic pole? 4218
21. Where is the earth's south magnetic pole? 4218
22. Is there any magnet more powerful than the earth? 4218

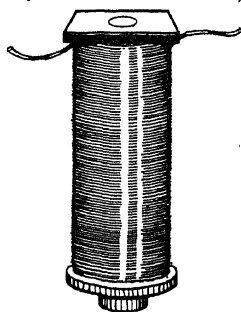
IV. Magnets as Our Helpers. See MAGNET AND MAGNETISM, 4216-4218; COMPASS*, 1591-1593; ELECTROMAGNET, 2193; MAGNETO-ELECTRIC MACHINE, 4219; TELEPHONE, 7068; TELEGRAPH (The Principle of the Telegraph), 7060-7062; STOCK TICKER, 6841; ELECTRIC MOTOR, 2184, 2187; DYNAMO, 2069; ELECTRIC BELL, 2170-2171; ASTRONOMY (The Contribution of Astronomy to Human Welfare), 475.

23. What had magnets to do with the discovery of America? 4216
24. Why doesn't a compass needle always point exactly north and south? 4218
25. What does "boxing the compass" mean? 1592
26. How does a mariner's compass differ from an ordinary pocket compass? 1591-1592
27. Why must correction charts for mariners' compasses be made? 1592, 475
28. What compasses are there which do not make use of magnetism? 1592
29. Examine the picture on page 2193. Could a permanent magnet be used for this work instead of an electromagnet? Why or why not?
30. Why isn't it possible to use a permanent magnet instead of an electromagnet in an ordinary electric bell? 2170-2171
31. Of what telephone instrument is a magnet an important part? 7068
32. Of what use is the electromagnet in a telegraph sounder? 7060
33. What is a magneto? 4219
34. What evidence that electromagnets are very important do you find in the pictures on pages 2184, 2187, 2069, and 6841?

Things to Do

1. Make an electromagnet by winding insu-

lated wire around a soft machine bolt. If the machine bolt is $2\frac{1}{2}$ inches long, about ten yards of no. 24 double-cotton-covered magnet wire will be needed. At each end of the wire leave about a foot of wire for making connections. When you connect the completed magnet to a dry cell, the magnet will pick up bits of iron and steel. When you break the circuit, the magnet will drop its load. Your completed magnet should look somewhat like the figure shown. A U-shaped electromagnet may be made according to the directions given on pages 7060 and 7061 for making a magnet for a telegraph sounder.



AN ELECTROMAGNET

2. Magnetize a steel darning needle by stroking it with one pole of a magnet. Stick the point of the needle into a flat cork. Let the cork float on water in a pan or bowl. If the needle is well magnetized, one pole of a magnet will pull the cork and needle toward it; the other will chase it away.

3. Try to pick up a piece of paper with a magnet. Put some small pieces of iron or steel under the paper. Try again to pick up the paper with the magnet.

4. Put a pocket compass flat on a table. Move a magnet around under the table close to the compass. What happens?

5. Connect an electromagnet to a dry cell. Find how many nails it will pick up. Put a second cell in the circuit. Is the magnet stronger? Do not leave the magnet connected to the dry cells except when actually using it.

6. Build a toy movable derrick. Attach a small electromagnet to the derrick in such a way that the magnet can be raised and lowered. Use the derrick and magnet for moving scraps of iron from one place to another.

7. On a map of the world, mark the north magnetic pole and the south magnetic pole. Page 4218 tells you where the magnetic poles are.

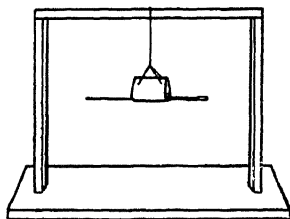
8. After you have connected an electromagnet to a dry cell, find out which pole of the electromagnet attracts the south pole of a permanent magnet. Then disconnect the wire which is attached to the positive pole of the cell, and attach it to the negative pole, and change the other wire from the negative pole to the positive pole. Does the pole of the electromagnet which did attract the south pole of the permanent magnet still attract it? What is the effect?

9. Make a compass in the following way: Magnetize a darning needle and put it in a paper stirrup. Hang the stirrup by a silk

thread to a wooden support, as shown in the accompanying picture. Glue the pieces of wood together instead of nailing them together.

10. Match the parts of sentences in the first list with those in the second.

- a. In most cases cases the core of an electromagnet.
- b. Like poles.
- c. Unlike poles.
- d. Magnets.
- e. Steel.
- f. The earth.
- g. The poles of an electromagnet.
- h. Magnetic compasses.
- i. Electromagnets.
- j. Neither kind of magnet.



NEEDLE IN PAPER STIRRUP

- a. repel each other.
- b. attract iron and steel.
- c. acts as a magnet with north and south magnetic poles.
- d. can be changed.
- e. can be made to lose their magnetism instantly.
- f. holds magnetism better than soft iron.
- g. is made of iron.
- h. attract each other.
- i. attracts all metals.
- j. contain permanent magnets.

Answers:

- | | |
|----------|----------|
| a and g. | f and c. |
| b and a. | g and d. |
| c and h. | h and j. |
| d and b. | i and e. |
| e and f. | j and i. |

UNIT THREE

Animal Communities

Main Understandings

1. Many animals are helped in their struggle for existence by banding together.
2. Community life among animals ranges from mere gregariousness to an elaborate division of labor, resulting in the dependence of the individual upon the community as a whole.

Animals as Social Beings

What, as you read the following paragraph, do you think it describes?

"There is much activity among the several thousand members of the colony. Some of the workers are busily engaged in bringing in food. Others are cleaning house and can be seen carrying out refuse. Builders are at work. Some of them are merely patching holes with bits of material which they have gathered together. Some of the workers are acting as guards to keep out unwelcome visitors. Others are busy ventilating the dwelling. Nurses may be seen feeding their young charges. The queen journeys about, surrounded by her 'ladies-in-waiting,' who are careful never to turn their backs upon her."

How very much like the activities of a community of people these activities sound! The paragraph was written, however, to describe the activities which go on in a hive of honeybees.

People, you see, are not the only animals that live in communities. Perhaps the simplest form of community or social life among animals is such a banding together as we find in flocks of sheep, schools of dolphins or porpoises, and herds of buffalo. Many birds which live in pairs through the season of raising their young gather into great groups when the time for migrating approaches. The big flocks of wild ducks and geese flying southward in

the fall are well known in many parts of the country.

You have doubtless read about the very interesting life of a beaver colony. Although the community life of the beaver is simple in comparison with that of the honeybee, it is considerably more advanced than that of sheep or porpoises.

The remarkable feature of the bee colony is that there is a division of labor—there is a distinct worker class, and some workers carry on certain tasks while other workers carry on other tasks. We expect that some of the workers in a community of people will be doing one kind of work, and others will do other kinds, but many of us are surprised when we find such a division of labor among the insects. Our wonder at the division of labor in a bee-hive increases when we discover that there is no directing head in a bee colony. Even without directions, moreover, no bee seems to be in any doubt as to what his work is, and no bee seems to try to shirk doing his share. Perhaps making comb is an easier task than ventilating the hive, but, if so, no worker appears to try to avoid the harder task.

In the simple animal communities there is little, if any, division of labor. It is true that one animal from a flock of Rocky Mountain sheep may serve as a lookout while the others of the flock are grazing, and that some birds seem to serve as leaders to decide upon the

course of flight during migration, but for the most part, all the animals of a group have much the same tasks. Scientists call animals which come together into simple communities *gregarious*.

The honeybee is not the only insect which has gone far past mere gregariousness in its social life. The ants, the termites, and the social wasps have communities in which the tasks are divided among the members, as in the bee colony. Whole books have been written about the lives of these insects.

It is easy to see that some animals, by banding together, have a better chance of surviving than they would have otherwise. As you probably know, more animals are produced than can possibly live. For this reason, there is going on all the time what scientists call the "struggle for existence." The records of the rocks tell us of many animals which have disappeared entirely. The help that animals in a group can give to one another is an advantage in the struggle for existence. A prairie dog helps his neighbors in a prairie dog village by uttering shrill cries at the approach of an enemy. A pack of hungry wolves can separate a big animal from a herd and kill it, while a single wolf could not do so. A community of beavers can build a dam, and can thereby assure the whole community suitable homes.

This is the age of insects. If man, by his intelligence, had not become the dominant form of animal life, insects surely would bear that distinction. They are man's real rivals. Some scientists have even gone so far as to suggest that in time the insects may win the struggle with man for supremacy. The success of some insects is doubtless due in part to their well-organized community life. The termite is a defenseless insect and one which is considered a delicious morsel by many insect-eating animals, but this defenseless creature has been able to hold its own in the struggle for existence. The care of the young in such a community as a termite community is extremely important.

Great as the success of the communal insects has been, we may well be glad that people are not organized into communities of exactly the same kind. Such an organization, although good for the community as a whole, is not a very good one for the individual. A bee which is sick is promptly thrown out of the hive; an unneeded queen is stung to death or smothered. An ant which is taken away from its community is likely to die; it is not possible for it to live a Robinson Crusoe existence. We see that, although these insect communities are extremely successful, they do not represent the highest form of community life. Man's communities, where there is much division of labor, but where the individual does not depend wholly upon

the group, represent a much higher type of social life.

Study Outline

[Numbers refer to pages in *THE WORLD BOOK Encyclopedia*. Articles starred (*) are to be read in full.]

- I. **Insect Communities.** See ANT*, 296-303; BEE*, 672-682; ARMY WORM, 418; HORNET, 3242; TERMITES*, 7111-7112; WASP (The Social Wasps, 7660); YELLOW JACKET, 7933.
 1. Why are some bees called "social" bees? 673
 2. How many classes of honey bees are there in a hive? 674
 3. What remarkable structures do worker bees possess to fit them for the work they have to do? 674
 4. Why has the word "drone" come to mean a person who does not do his share of work? 674
 5. How many queens does a hive need? 675
 6. What work does a queen bee do? 676
 7. Of what use is the sting of the worker bee? 675
 8. Of what use is the queen bee's sting? 675
 9. About how many honeybees are there in a swarm? 675
 10. What change must take place in flower nectar before it is honey? 676
 11. What is remarkable about the cells of honeycomb? 676
 12. What is the first work which a worker bee does? 677
 13. What kinds of work does the worker bee next learn to do? 677
 14. What work does a worker bee do during the latter part of its life? 677
 15. How are bees which do not belong in a particular hive kept out? 676
 16. How is a new queen produced? 677
 17. Why do bees swarm? 678
 18. How do honeybees spend the winter? 678
 19. What are the four stages in the life of a honeybee? 676
 20. How does a bumblebee community differ from a honeybee community? 679
 21. What strange guest may be found in a bumblebee's nest? 679
 22. In what respect do ants rank next to man in the animal world? 296
 23. What change in the habits of ants has made it possible for ants to live in large colonies? How has it made this possible? 297
 24. What are the three classes of ants? 297
 25. Is there only one queen in an ant community? 297
 26. How is a new ant colony started? 298-299

27. What are the duties of the worker ants?
299
28. What are the "ant cows"? 301-302
29. How do ants take care of their "cows"?
301-302
30. Are farmers glad or sorry that ants
take care of their "cows" so well? 303
31. How did umbrella ants get their names?
302
32. Of what use are the fungus gardens
some ants raise? 302
33. What are ant "slaves"? 303
34. What is remarkable about the habits
of the driver ants? 303
35. How many classes of termites are there?
7112
36. Do termites resemble the ants and bees
in the care they take of the young
insects? 7111
37. What determines whether a termite egg
will become a soldier, a worker, a
king, or a queen? 7112
38. In what ways is a community of social
wasps like a community of honey-
bees? 7660
39. What are some of the ways in which
the communities differ? 7660
40. How did the army worm get its name?
418

- II. Other Animal Communities.** See BEAVER*, 665-667; BIRD (Migration of Birds, 764-765); BUFFALO (American Buffalo or Bison, 1003-1005); CHAMOIS, 1300-1301; PELICAN, 5447-5448; PENGUIN, 5457; PRAIRIE DOG, 5795-5976; SEAL (Life Habits, 6466); WOLF, 7817; SPIDER, 6760-6764; LION, 4037-4040.
41. From the references given above, find which ones of the following animals live in communities: Penguin, pelican, spider, lion, seal, prairie dog, beaver, bison.
 42. In what way is the community life of the beaver more advanced than that of the penguin or seal? 666-667, 6466, 5457
 43. What kind of a house does the beaver build? 666
 44. In what ways do beavers help each other? 666, 667
 45. Of what use are the dams which beavers build? 667
 46. What do you consider the chief difference between the community life of the beaver and that of the honeybee? 674-675, 666-667
 47. In what ways does a beaver in a cage sometimes show its community instincts? 667
 48. How may one chamois help others of the group? 1301
 49. At what season do many birds organize

- themselves into communities? 764-765
50. What accounts for the disappearance of the mighty herds of buffalo which once roamed over the Great Plains? 1003
51. In what way do the pelicans of a colony help one another? 5448
52. In a penguin colony is there a worker class which corresponds to the worker class of honeybees? 5457
53. At what season of the year are wolves gregarious? 7817
54. What advantage is there in their banding together at this season? 7817
55. What is a seal "rookery"? 6458

Things to Do

1. A "Suggest" Puzzle. Each word or phrase in the first column should suggest one of the animals named in the second column. Copy the two columns, and draw lines connecting the words or phrases of the first column with the names of the animals they suggest.

DAMS	TERMITES
PAPER NESTS	BEAVERS
POLLEN BAGS	BEES
APHID COWS	SOCIAL WASPS
NESTS TALLER	ANTS
THAN A MAN	

2. Read "Red Dog" in Kipling's "Jungle Book." Of course, part of this story is not true, but it gives a good idea of how powerful great communities of animals may be.

3. Make a formicarium similar to the one shown on page 302.

4. Examine some honeycomb in a frame. Notice the shape of each cell. Of what material are the cell walls made? Does the honey leak out before the comb is cut? Are there any cells containing eggs in the comb you are examining?

5. Watch the bees entering and leaving a beehive. Can you see why a "bee line" means a straight line? Demonstration hives may be bought which permit the work going on inside the hive to be observed. Watch the bees at work in one of these hives, if possible.

6. Try to answer the questions given on pages 300 and 301. Keep score for yourself. If you can answer them all, your score is 50, because there are fifty questions. If there are ten you cannot answer, your score is 40. All of these questions are answered in the article about ants. If, therefore, there is any doubt in your mind as to whether you know the answer to a question, you can find the answer in the text. Play the same game with yourself with the questions about bees, given on pages 680 and 681.

7. Hidden in the following square are the names of five animals which are gregarious in

habit. Begin with the letter at the upper left-hand corner. Move from letter to letter in any direction until you have spelled the name of the first animal. Move one move in any direction from the last letter in the first word to find the first letter of the second word. Do not use any of these thirty-six letters twice.

S E N D E R
S A E I E P
I L R I A R
O N I R I E
M C U E P D
A H G N G O

8. **A Group Game.** Make a set of fifty questions about animals which live in communities. The questions should be questions which can be answered in one word. The answer to a question may be "Yes," "No," or any other single word. You may take questions from pages 680, 681, 667, 500, and 501, if you wish. Use these questions in playing a spell-down game. A leader is needed. The other players are divided into two groups of equal size. If the group cannot be divided evenly, the extra person acts as a referee whose duty it is to look up in the encyclopedia any answer about which there is a dispute. If there is no referee, the leader must settle disputes. The leader then asks the questions one after another, as in a spelling match. A person who cannot answer or who answers incorrectly is out of the game. A "yes-or-no" question, if missed, is not passed on to the next person in order, because after it has been

missed the answer is obvious. The side which has the larger number remaining in the game after all the questions have been asked wins.

9. Find out on page 1523 how many eggs a single codfish can produce at one spawning period. Suppose that all these eggs hatch and grow to maturity, and that half the number are female codfish. How many eggs could these codfish produce at a single spawning period? How do you account for the fact that artificial propagation must now be practiced to keep the codfish from losing ground in its struggle for existence?

10. Read what there is in this encyclopedia about Fabre, a famous scientist who found out much about the community life of various insects. You will find a list of his more important books at the end of the article.

Answers to Puzzles

1.
DAMS suggest BEAVERS
PAPER NESTS " SOCIAL WASPS
POLLEN BAGS " BEES
APHID COWS " ANTS
NESTS TALLER
THAN A MAN " TERMITES
7.
SEAL PENGUIN
REINDEER CHAMOIS
PRAIRIE DOG
9. 3,645,000,000,000 eggs produced by 1,350,000 codfish.

UNIT FOUR

Bird Migration

Main Understandings

1. Many birds migrate.
2. Migration accounts for the fact that the bird population of a locality changes to a considerable extent with the seasons. Some birds stay in one region the year round, while others stay for the summer only, for the winter only, or for only a few days during periods of migration.
3. The problem of why birds migrate has not been fully solved, but the instinct to migrate doubtless originated in attempts to find better surroundings than could be had otherwise.
4. How birds are guided in their travels is another problem which has not been fully solved.

The Wonderful Journeys of the Birds

A bobolink in January! What a surprising sight that would be to us in regions of snow and ice! A bobolink in July wouldn't be nearly so much of a surprise. Of course, the reason that we do not expect to see bobolinks in January is that the bobolink belongs to that great group of birds which travel to the south to spend the winter. If you should take a census of the birds in your locality in January and another in July, you would find that the bird population changes greatly with the seasons. Some birds, however, you would find on both your lists, for some birds stay with us

the year round. The crow, the cardinal, the bluejay, and the English sparrow are permanent residents in a large part of the United States.

In many places, the number of permanent bird neighbors is small in comparison with the number of birds which spend only a part of the year in those regions. A list made a few years ago of the birds which had been seen at some time during the year near New York City included one hundred eighty. Of these, thirty-seven birds were permanent residents, and one hundred forty-three were visitors for only a part of the year.

Many birds spend the summer with us and

go south for the winter, as the bobolink does. Some of our bird visitors stay with us for the winter months only, and journey farther north for the summer. In many parts of the United States, it would be as much of a surprise to see a junco in June as to see a bobolink in January.

There is a third group of visitors who remain with us for only a very short time on their way north in the spring and again on their way south in the fall. Many of the warblers, for example, spend their summers in Northern United States and Canada and go for the winter to Central or South America. In most parts of the country, their visits are merely stop-overs on their long journeys.

The trips which birds make from their summer homes to their winter homes and from winter homes to summer homes are called *migrations*. Although other animals migrate, the migrations of the birds are the most wonderful of all migrations.

If you had never heard that many birds have winter homes in one place and summer homes in another, you might be very much puzzled by the changes in the bird population. It is interesting that, before people knew about bird migration, they made up stories to account for the absence of some species of birds during certain parts of the year. One of these stories was that some birds buried themselves in the mud during the winter. Another was that certain birds changed to other birds at the approach of cold weather, and a third was that some birds spent the winter on the moon.

People were slow to learn about bird migration, because we seldom see the smaller birds migrating. Having seen large birds, such as ducks and geese, flying southward in flocks, people probably first got the idea of bird migration, and when they watched closely they found that migration is very common among birds. Marking birds with bands on their legs has helped scientists to find out much about their migration. Now we know not only which birds migrate, but also where most of them go, and about how long it takes them to make their trips.

Although we are no longer puzzled by the sudden appearance and disappearance of many of our bird neighbors, there are two questions which have puzzled scientists ever since they have studied bird migration: Why do birds migrate? How do they find their way?

The long journeys which birds take are often dangerous. Sometimes a storm kills hundreds of migrating birds at one time. Some birds are believed to get so tired from their long journeys that they drop dead on the way. Then, too, many birds become lost from their flocks. Thousands of birds dash against light-houses and other bright lights and are killed. Of course, hunters' guns kill thousands of large

birds during migration. To lead them to brave such dangers as these, the necessity for migrating must be, or must have been at some time in the past, a very great necessity. Probably you think you can give the reason why birds need to migrate. Whatever you think is the reason, your conclusion is practically certain not to explain all that we know about the journeys birds make. All that scientists can be sure of is that birds have a feeling or instinct which makes them migrate. Migration doubtless originated in attempts of birds to find better surroundings for themselves. But exactly what led to the development of this phenomenon remains a mystery—one of the great mysteries of the animal world.

Birds which fly over the land may be guided on their journeys by such surface features as big rivers. The problem of how the birds which fly for thousands of miles over the ocean find their way is very puzzling. Scientists have found that birds have a very keen sense of direction. Perhaps this is a large part of the answer to the question of how they find their way.

Study Outline

[Numbers refer to pages in THE WORLD BOOK Encyclopedia. Articles starred (*) are to be read in full.]

I. Our Changing Bird Neighbors. See

THRUSH, 7162-7163; WOODPECKER, 7833-7834; WARBLER, 7593-7594; BALTIMORE ORIOLE, 590-591; MARTIN, 4308; CATBIRD, 1240; BROWN THRASHER, 981; WAXWING, 7684-7685; SWALLOW, 6946; BRANT GOOSE, 924; CROW BLACKBIRD, 1759; REDSTART, 6034; NUTHATCH, 5120-5121.

- i. From the references given above find out whether each of the following birds, if it can be found in your locality, is a permanent resident, a summer resident, a winter resident, or a visitor for only brief periods at the times of migration: Wood thrush, downy woodpecker, hairy woodpecker, myrtle warbler, Baltimore oriole, purple martin, catbird, brown thrasher, Bohemian waxwing, barn swallow, Brant goose, bronzed grackle, white-breasted nuthatch, redstart.

II. Bird Travels. See BIRD (Migration of

Birds*, 764-765; Flight, 752); SWALLOW, 6946; BOBOLINK, 811; PLOVER, 5659; TERNS 7112-7113; PASSENGER PIGEON, 5407; GOVERNMENT PROTECTION OF BIRDS, 766; HUMMING BIRD, 3287; BLUEBIRD, 804; YELLOWLEGS, 7933; CURLEW, 1787.

2. What bird travels farthest in the course of a year? 7113, 765, 752

3. How do the migration flights of some birds differ from those of other birds? 765
4. In what order do birds usually fly during migration? 765
5. At what rate do they fly? 752
6. Why do birds usually fly at a different rate during their fall migration than in the spring? 765
7. How do scientists account for the long stop-overs which some birds make during their southward journeys? 765
8. What is the average height at which birds fly during migration? 752
9. How do the apparently feeble birds which we see making only short flights from one tree to another manage to reach distant places?
10. How does bird-banding help us find out about bird migration?
11. Why do so few people see birds migrating? 752, 764, 765
12. What is the "migratory bird law"? 766
13. How much dependence can be put in the regularity of the migration of the purple martin? 753
14. How does the bobolink's plumage differ at the two migration periods? 811, 753
15. Why does the bobolink make long stop-overs on its trip to its winter home? 765
16. How far does the yellowlegs travel each year in its migration? 7933
17. Where does the ruby-throated humming bird spend the summer? The winter? 3287
18. How far does the barn swallow fly in its yearly migration? 6946
19. Do all bluebirds go to the same region for the winter? 804
20. How do the travels of the golden plover compare with the travels of the bluebird? 5659, 804
21. What is remarkable about the plover's journey? 765
22. What accounts, at least in part, for the fact that the Eskimo curlew is almost extinct? 1787
23. What was remarkable about the migration of the now extinct passenger pigeon? 5407

III. Puzzles about Bird Migration. See BIRD (Migration of Birds*, 764-765; Senses, 753).

24. What evidence have we that birds do not migrate merely to escape from the cold? 764
25. How important is the need for food in accounting fully for migration? 764
26. What do scientists think the ice age

- may have had to do with bird migration? 764
27. What is the best answer which scientists are now able to give to the question of why birds migrate? 764
28. What may account for the seven "trunk lines" along which many birds migrate? 765
29. Can scientists account for the routes of the ocean-going birds? 765
30. What is the so-called "sixth-sense" of birds?

Things to Do

1. Read MIGRATION OF ANIMALS, page 291, to find out about other animal migrations.
 2. Draw in color two pictures of a male bobolink, one to show the bobolink's plumage at the time of the fall migration, and the other to show his plumage at the time of the spring migration.
 3. Pretend you are one of the birds whose migration journey is very long, and describe the trip you take each year.
 4. **A Puzzle.** If you guess correctly the names of the birds described below and write the names in order, the initial letters will spell the name of a bird which, because it has its summer home in the far north and its winter home in the far south, has more hours of daylight in a year than any other living creature. (The birds of this puzzle are all named on page 770, and descriptions of them may be found by looking up the names.)
 - a. The large sea bird which played so important a part in Coleridge's *Ancient Mariner*.
 - b. A warbler which, because of its bright salmon red markings, looks like a little oriole.
 - c. A "sea duck" which is highly valued as food.
 - d. The bird family to which the robin and bluebird belong.
 - e. One of the beautifully colored buntings.
 - f. A long-legged wading bird which has suffered much from hunters' guns during its migrations.
 - g. The commonest of American vultures.
 - h. A bird which has been used as a symbol of strength and courage.
 - i. A very common bird and one of the first to come back from the south in the spring.
 - j. A bird which is a relative of the whip-poor-will and which may be seen after sunset flying high in the air after insects.
 5. Make a bird puzzle similar to the one given above.
 6. The map on page 765 of THE WORLD BOOK shows the migration route of one of the following birds: Catbird, bluebird, Brant goose, Baltimore oriole, golden plover.
- Which bird's route does it show? You can find the answer by reading about these birds in THE WORLD BOOK.

7. Make a similar map to show the migration of some other bird.

8. Keep a record of the dates in the spring when you first see the common summer-resident birds of your locality.

9. Choose ten common migratory birds, and make a table showing where each of these birds spends the summer and where it spends the winter.

10. **A Bird Game.** The person who is "it" says, "I am thinking of a bird which is a permanent bird resident here (or summer resident, winter resident, or visitor for a short time)". The others who are playing take turns asking questions which can be answered by

"yes" or "no," in order to find out what bird has been chosen. If they succeed in guessing the bird in twenty or fewer questions, the one who guesses the bird is "it." If they cannot guess in twenty questions, the one who chose the bird is "it" again.

Answers:

- | | |
|--------------------|--------------------|
| 4. a. Albatross. | f. Curlew. |
| b. Redstart. | g. Turkey buzzard. |
| c. Canvasback. | h. Eagle. |
| d. Thrush. | i. Robin. |
| e. Indigo bunting. | j. Night hawk. |
| 6. Golden plover. | |

UNIT FIVE

Conduction of Heat

Main Understandings

1. Heat travels through materials from one place to another.
2. Some substances are better conductors of heat than others.
3. Poor conductors can be used to keep heat from traveling rapidly either into or out of a material.
4. Good conductors permit heat to travel rapidly into or out of a substance.
5. How warm any object feels to the touch depends partly upon how good a conductor of heat it is.

Good and Poor Conductors, and How We Make Use of Them

Probably you have never been foolish enough to touch your tongue to a metal doorknob, an iron fence, or a skate-runner on a very cold winter day. Asking a child to do this is a rather common, but cruel, joke. What happens is that the metal carries the heat away from the tongue so rapidly that the moisture on the tongue freezes and holds it fast to the metal. If you touch your tongue to a piece of wood instead of to a piece of metal, this will not happen, because wood cannot carry the heat away as rapidly as metal does.

Whether you have had this experience or not, you surely have had many experiences which show you that heat can travel through materials from one point to another, and that heat travels through some materials more rapidly than through others. You know, for example, that the handle of a silver spoon gets hot when you are eating hot soup with the spoon. You know, too, that you can use a cloth pad to protect your hand when you are lifting a hot cooking pan, and that a fur coat will keep you warm even on a very cold day.

If heat travels rapidly from particle to particle of a substance, we say that that substance is a good conductor of heat. If it doesn't travel rapidly from particle to particle of the substance, we say that the substance is a poor conductor of heat. Although there are many good conductors of heat, these good conductors are not all equally good. Copper is a very good conductor of heat, but it is not as good

a conductor as silver. Lead is a good conductor, but it is not as good as copper. In the same way, not all of the poor conductors are equally poor. Hard wood, for example, is a poor conductor, but it is a better conductor than wool.

People have learned to use good conductors when they wish heat to travel into or out of a substance rapidly. We make most of our cooking utensils of metal not only because the metal will not burn, but also because the heat from the fire travels quickly through the metal into the food which is to be cooked. When food has been cooked and we wish it to cool rapidly, we put it into a metal pan so that the heat will travel out of it rapidly. One reason the pans which hold the ice cubes in an electric refrigerator are made of metal is because the heat can travel through the metal rapidly, and the water will freeze more quickly than if some material such as glass, which is not a good conductor, were used.

Notice that the last paragraph tells you that food and water become cold when heat travels from them. Cold cannot travel into or out of anything. Of course, cold air, cold water, and other substances which are cold may travel from place to place, but, to make a substance cold, we must cause heat to travel from it.

Whenever you wish to shut heat either in or out of anything, you should use a poor conductor. Thermos bottles, fireless cookers, and refrigerators are a few of the many applications of our knowledge about using poor conductors to keep heat from traveling rapidly.

Would you be surprised to find ice wrapped

in a woolen blanket to keep it from melting? Wool, of course, is what we wear to keep ourselves warm in winter, and no one wishes to keep ice warm. However, many people do wrap ice in wool, if they have no refrigerators and have to keep it in a pan or a tub. The point is that wool can shut heat out as well as shut it in. You wear woolen clothing in winter to keep in the heat of your body; ice is wrapped in wool to shut the heat out. Wool does not make things warm; it merely keeps heat from escaping rapidly. In the same way, wrapping a cold brick in fur would not make the brick warm, but if the brick were warm, it would keep the heat from traveling away rapidly.

Knowing about conduction of heat should also help you to understand why we cannot tell temperature accurately by feeling. Suppose water and air are both exactly 70 degrees Fahrenheit. The water would feel cooler than the air because it is a better conductor than air, and it would carry the heat away from your body faster than the air would. In winter a cold hard-wood floor feels colder than an equally cold woolen rug, even when the two are the same temperature, because the wood carries the heat away from your body faster. If wood and brass were both equally hot but both hotter than your hand, the brass would feel hotter because it would carry heat to your hand faster. This explains why a cake pan which has been in a hot oven feels much hotter than the cake in the pan feels. In the study of conduction of heat, therefore, we find part of the answer to the question of why we must depend upon thermometers to tell temperature.

Study Outline

[Numbers refer to pages in THE WORLD BOOK Encyclopedia. Articles starred (*) are to be read in full.]

I. Good and Poor Conductors of Heat. See HEAT (Conduction, 3113).

1. Which of the following statements are true? 3113
 - All solids are good conductors of heat.
 - All gases are good conductors of heat.
 - All liquids are good conductors of heat.
 - All gases are poor conductors of heat.
 - All metals are good conductors of heat.
2. Which of the following substances are good conductors, and which poor: Air, wool, silver, glass, paper, iron, wood? 3113
3. As you have been told, if you touch a good conductor which is warmer than your hand, it feels warmer than a poor conductor of the same temperature. Which, then, would feel warmer to your hand, a piece of hot silver or a piece of stone equally hot?

4. Remember that a good conductor feels colder than does a poor conductor to a hand warmer than it is. Which, then, would feel colder to your hand, a piece of cold iron or a piece of equally cold wool?

II. How We Use Good and Poor Conductors of Heat. See THERMOS BOTTLE*, 7146; FIRELESS COOKER*, 2433-2434; REFRIGERATION, 6042; INSULATOR, 3468-3470; ASBESTOS, 438; ICE CREAM (Freezer), 3331; SAFETY LAMP, 6295; STOVE, 6870; HEAT (Conduction), 3113; ICE, 3327.

5. Why can a thermos bottle keep hot things hot? 7146
6. Why can the same thermos bottle keep cold things cold? 7146
7. What keeps the heat from escaping from a thermos bottle? 7146
8. Why are the glass walls of a thermos bottle silvered? 7146
9. How long will a thermos bottle keep hot things hot or cold things cold? 7146
10. Of what importance is the fact that asbestos is a poor conductor of heat? 438, 7146.
11. Does a fireless cooker make food hot or keep it hot? 2433
12. How does a fireless cooker differ from a thermos bottle? 2433, 7146
13. Name five materials which can satisfactorily be used in the walls of a fireless cooker. 2433-2434
14. Ice cream is sometimes carried to picnics in fireless cookers. Why will a fireless cooker keep ice cream from melting rapidly?
15. What is wrong with the statement, "Cold is put into the foods kept in a refrigerator"? 6042
16. What use of a poor conductor of heat do you find in the diagrams on page 3327?
17. What uses of heat insulators are shown on page 3469?
18. Why do farmers sometimes store vegetables in the ground? 3468
19. Why should air spaces be left in the walls of refrigerators? 3113
20. Why does woolen clothing keep us warm? 7146
21. Why is a down comforter likely to keep one warmer than an equally heavy cotton blanket? 7146
22. Why do many pots and pans have wooden handles? 7146
23. What has the working of a safety lamp to do with conduction of heat? 6295
24. What rôle does a good conductor play in an ice cream freezer? 3331

25. Of what material are most wood- and coal-burning cooking stoves made? Is this material a good or a poor conductor of heat? 6870
26. After what you have read about conduction of heat, which of the following suggestions do you consider sensible?
 - (a) Carry ice cream in a metal bucket on a hot day.
 - (b) Use a woolen holder to lift a hot skillet off the stove.
 - (c) Put warm lemonade in a thermos bottle if you wish it to cool quickly.
 - (d) Carry your skates by the runners instead of by the straps on a cold winter day if you are not wearing gloves.
 - (e) Use a wooden spoon for stirring jam if it has to be stirred often while it is cooking.
 - (f) Put newspaper between a plant and a window on a cold night to keep the plant from freezing.

Things to Do

1. Make a fireless cooker according to the directions given on page 2434.
2. Take a thermos bottle apart. How many of the parts labeled in the diagram on page 7176 can you find?
3. Light a match. Hold it until you have to drop it because of the fire. It should be dropped into a pan of water. Does the experiment show you that wood is a good or a poor conductor of heat? Do not confuse the movement of the flame along the stick with the heat through the stick.
4. With sealing wax fasten a marble about six inches from one end of a piece of wire. Hold the end of the wire in a flame. What happens to the marble? Why?
5. Secure a piece of glass tubing about eight inches long. Smooth the ends by holding them, one after the other, in a gas flame until the glass just gets red hot. After both ends are cold, hold one end of the tube in each hand and hold the middle of the tube over the flame. Turn it slowly. When the glass is soft, bend it slightly to make a lemonade straw. Is glass a good or a poor conductor?

6. Stand a tumbler of water aside until a thermometer shows that it has the same temperature as the air in the room. Hold one of your hands in the water and the other in the air. Which feels cooler, the water or the air? Which is the better conductor?

7. A Pyramid of Poor Conductors:

R I A
R E P A P
T I N G E A R
N A I L O R P E C
M E N R A I L O O W L

Arrange the letters of each row so that they spell the name of a poor conductor of heat.

8. Another Puzzle:

Hidden in the square below are the names of five good conductors of heat. Begin with the S in the upper left-hand corner. Move in any direction one letter at a time until you have spelled the name of a good conductor. Cross off the letters as soon as you have used them. No letter is to be used twice. From the last letter in the first word move in any direction to find the first letter of the next word.

S L V L D
D I E O M
E A R G E
L O I C R
N R Y R U

9. Find as many materials as you can which are used as heat insulators.

10. Take a piece of paper about four inches by six inches. Fold it lengthwise twice. Fill a test tube about one-fourth full of water. Put the folded strip of paper around the top of the test tube. Use the ends of the paper as a handle with which to hold the test tube. Hold the test tube at an angle in the flame of a burner. Can you hold the paper handles while the water boils? What does this show you about the ability of paper to conduct heat?

Answers:

7.

A I R
P A P E R
G R A N I T E
P O R C E L A I N
M I N E R A L W O O L

8. Silver, gold, mercury, iron, lead.

UNIT SIX

Air Pressure

Main Understandings

1. Air exerts pressure
2. The fact that air exerts pressure helps explain many common phenomena.
3. Air pressure can be made to help us in many ways.
4. Air pressure can be measured with a barometer.
5. Weather varies with variations in air pressure.

The Importance of Air Pressure

On the cover of an old German science book there is a picture of a famous experiment—an experiment so remarkable that even the emperor of Germany was asked to see it. This experiment was performed nearly three hundred years ago by the German scientist, Otto von Guericke. He had made two iron hemispheres which fitted smoothly together to form a ball about two feet in diameter. There was one opening in the ball, an opening which could be closed with a valve. These hemispheres were heavy enough to fall apart of their own weight. When, however, von Guericke pumped a large part of the air out of the hemispheres with the new air pump which he had invented, and closed the valve so that no more air could get in, the air on the outside of the hemispheres pushed so hard that when eight horses were harnessed to each hemisphere, the sixteen horses could hardly pull the hemispheres apart.

Think how remarkable this experiment must have seemed at a time when few people understood that air weighs something, and that it presses with great force upon objects on the surface of the earth. Torricelli, the famous Italian scientist, had only recently made the discovery that air does exert pressure. Most of the people of that time didn't even think of air as being a substance which takes up space. Of course you know that air takes up space just as water does—no one could live in this age of automobiles and ride about on tires inflated with air without realizing it. A so-called empty bottle is not empty—it is full, as you very soon find out when you try to fill it with something else without allowing the air to escape.

You have felt the pressure of rapidly moving air, and you have seen evidences after storms that winds may exert tremendous pressure, but you may not have known that still air exerts great pressure, too.

We still use in science laboratories smaller hemispheres like those made by von Guericke to show that air exerts pressure. If hemispheres only five inches across are used, two people cannot pull them apart after a large part of the air has been pumped out. This is not surprising, for the pressure on the outside of the hemispheres is more than a thousand pounds. When the hemispheres are filled with air, the pressure from the inside out is as great as the pressure on the outside, and the hemispheres can be pulled apart very easily.

Of course, a cubic foot of air is not nearly as heavy as a cubic foot of water; but, since we are at the bottom of a great ocean of air, there is so much air above us that it weighs a great deal, and because there is so much of it, it presses upon things with great force.

Knowing that air exerts pressure helps to explain many common things which may have puzzled you. Why, if you turn a bottle full of water upside down, with the opening below the surface of water in a pan, does the water stay in the bottle? The answer is that the air pressing on the surface of the water in the pan holds the water in the bottle. Why will a little bottle from which you have "sucked" the air stick on the end of your tongue? Air pressure holds it there. Why does water gurgle as it flows out of a bottle with a small neck? The air pressing on the liquid in the bottle keeps it from flowing out smoothly because it must get in to take the place of the water. Why does ink run uphill into your self-filling fountain pen when you fill it? Air pressure pushes the ink up into the pen. The pen does not fill itself; air pressure does most of the work.

Whether or not you have understood before that air exerts pressure, you are practically sure to have used air pressure to help you. Whenever you have used a pump to lift water from a well, a lemonade straw to lift lemonade to your mouth, a pipette to get medicine from a bottle, a suction cap to fasten a small electric lamp to the wall, a siphon, or a vacuum cleaner, you have used the pressure of the atmosphere to help you.

Air pressure can be measured with a barometer. Of course, it wouldn't be necessary to have a device for measuring air pressure if it were always the same in all places. But even if air pressure does change, what good does it do to measure exactly what it is? The pressure of the atmosphere is never so low that you can't drink lemonade through a straw, or use a vacuum cleaner; and it is never so high that there is any danger of its crushing you. Why know exactly what it is? One important reason for having barometers is that they are useful in predicting the weather. When the air pressure is rising, you may expect quite a different sort of day from one on which the air pressure is falling rapidly. The barometer is the most important instrument to be found in a weather bureau, and many people have barometers in their houses so that they may do their own weather forecasting. A barometer is a much more accurate weather prophet than one of the common little figures whose dress is supposed to be blue when it is to be a fair day, and pink when there is likely to be a shower.

Study Outline

[Numbers refer to pages in THE WORLD BOOK Encyclopedia. Articles starred (*) are to be read in full.]

- I. The Great Pressure of the Air. See AIR (Weight; Buoyance), 109; VACUUM*, 7439-7440; AIRCRAFT (Problems to Be Solved), 117.

1. With how much force is the air pressing down on this page? 109
 2. What makes it possible for you to lift the page? 109
 3. What does the word "atmosphere" mean? 109
 4. Why does the atmosphere exert pressure? 109
 5. What is a vacuum? 7439
 6. Can a perfect vacuum be obtained? 7440
 7. What is the most nearly perfect vacuum which can be obtained? 7440
 8. What does the illustration on page 109 show?
 9. What is the atmospheric pressure per square inch at sea level? 109
 10. Is atmospheric pressure the same everywhere on the earth? 109
 11. Is atmospheric pressure always the same in any one place? 109
 12. Why aren't you mashed by air pressure? 109
 13. How does the fact that air pressure changes make the problems of dirigible balloons more complicated? 117
 14. Suppose you are holding in your hand a bucket eight inches in diameter. The air is pushing down on the bottom of the bucket with a force of more than 700 pounds. Why doesn't the air push the bucket out of your hands?
 15. What do you think would happen to you if the air pressure on the outside of your body were very greatly and suddenly reduced?
- II. Using Air Pressure to Help Us.** See VACUUM*, 7439-7440; VACUUM CLEANER*, 7440; SIPHON*, 6625; PUMP (The Lift Pump; The Force Pump), 5880; DIVING (The Diving Bell), 1974; CAISSON, 1070-1071.
16. How can a vacuum cleaner be used to help solve crimes? 7440
 17. Is dirt pushed or pulled into a vacuum cleaner? Explain. 7440
 18. What has the working of a vacuum cleaner to do with air pressure? 7440
 19. Of what use is the fan in a vacuum cleaner? 7440
 20. Why must the bag of a vacuum cleaner be porous? 7440
 21. What has air pressure to do with the working of a lift pump? 5880
 22. Why must a lift pump have two valves? 5880
 23. How high can a lift pump lift water? Why not higher? 5880
 24. In what way is a force pump better than a lift pump? 5880
 25. What has air pressure to do with the working of a siphon? 6625
 26. Can gasoline be siphoned from a gasoline can on the ground up into the gasoline tank of a car? Why or why not? 6625
 27. Can water be siphoned over a hill twenty feet high? Why? 6625
 28. Can water be siphoned over a hill forty feet high? Explain. 6625
 29. What has air pressure to do with drinking lemonade through a straw? 7440
 30. Could you drink lemonade through a vertical straw thirty-five feet long? Why do you think this way?
 31. What keeps the water out of a diving bell? 1974
 32. What has air pressure to do with a pneumatic caisson? 1071
 33. Of what use is such a caisson? 1071
- III. Measuring Air Pressure.** See BAROMETER*, 625-627; TORRICELLI, 7220-7221.
34. How does an aviator know how high above the earth he is? 626
 35. What does the word "barometer" mean? 626
 36. Why is mercury a more satisfactory liquid than water for a barometer? 626
 37. How tall must a mercury barometer be? 626
 38. How tall was von Guericke's water barometer? 626
 39. How tall was Pascal's wine barometer? 626
 40. What is a barograph? 626
 41. Do all barometers contain some liquid? Why is this possible? 627
 42. Who invented the barometer? 7220
 43. If the mercury in a mercury barometer rises, what does that indicate about the air pressure? 626
 44. Would you expect a week's air pressure record on a barograph chart to be a straight line? Why or why not?
- IV. Air Pressure and the Weather.** See BAROMETER*, 625-627; ISOBARS*, 3567.
45. People with rheumatism are likely to be more uncomfortable on stormy days than on clear days. Why? 626
 46. Of what use are the barometers which many people have in their houses? 626
 47. If the mercury in a mercury barometer is falling rapidly, what kind of weather are we likely to have? 626

48. If the mercury in a barometer is rising, what kind of weather are we likely to have? 626
49. On what kind of a map are isobars found? 3567
50. Do winds blow toward or away from areas of low pressure? 3567

Things to Do

1. With a rubber tube siphon water from one tumbler to another. Be sure to fill the siphon with water before you try to make it work. When does the siphon stop flowing if the tumblers are level? Put one tumbler on a block of wood about an inch high. When does the water stop flowing through the siphon? You will find a picture of a simple siphon on page 6625.

2. Fill a bottle with water. Put a cork in the neck of the bottle. Turn the bottle upside down, put the neck of the bottle below the surface of the water in a pan, and remove the cork. Does the water in the bottle stay in or fall out? What has air pressure to do with this experiment? Read about the mercury barometer to find an explanation of this experiment.

3. Turn an ordinary glass tumbler upside down and force it straight down into a pan of water. Does water come up far on the inside of the tumbler? Was the tumbler empty when you began your experiment?

4. For this experiment you need a milk bottle, a hard-boiled egg from which the shell has been removed, and a match. Light the match, and drop it into the milk bottle. Then put the egg in the neck of the bottle. Watch what happens to the egg. To explain the result, you have to know that air expands when heated and contracts when cooled, and that air exerts pressure.

5. Fill a tumbler level full of water. Put a piece of writing paper over the top of the tumbler. Moisten the edges of the tumbler, and be sure that the paper touches the edge all the way round. Then turn the tumbler upside down. What keeps the water from falling out?

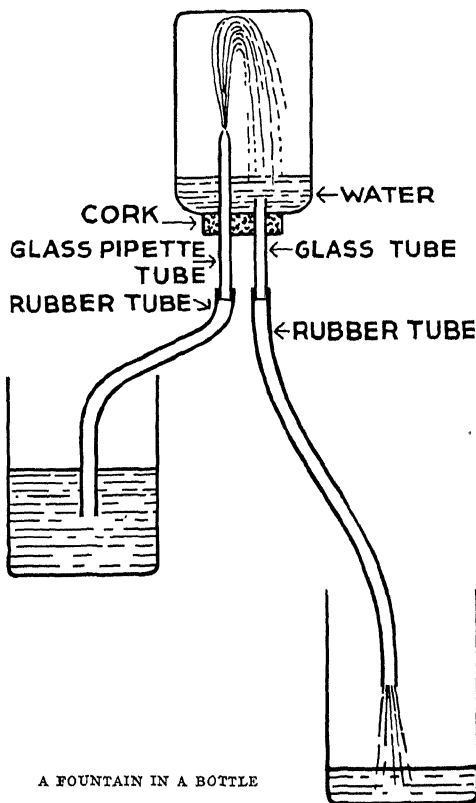
6. **A Sentence-Matching Game:** In the first group below, there are the first parts of ten sentences. In the second group are the last parts of these sentences. Match the parts of the sentences in the first list with those in the second list so that you have ten true statements.

- (1) A space from which practically all the air has been pumped
- (2) Air pressure
- (3) Barometers
- (4) Air pressure at sea level
- (5) Air pressure high in the air
- (6) Gravity
- (7) Mercury
- (8) Water

- (9) Isobars
- (10) Falling air pressure
 - (a) is about fifteen pounds per square inch.
 - (b) measure air pressure.
 - (c) connect places of equal pressure on weather maps.
 - (d) indicates the approach of bad weather.
 - (e) is called a vacuum.
 - (f) is sometimes spoken of as suction.
 - (g) is less than at sea level.
 - (h) is used in many barometers.
 - (i) makes the air weigh something.
 - (j) can be siphoned over hills if they are not too high.

7. The area of a grown person's body is somewhere near 2,000 square inches. Figure with how much force the air is pressing on a body of that size.

8. From the description given on page 1071,



A FOUNTAIN IN A BOTTLE

draw a diagram of a pneumatic caisson. Be sure to show the air lock.

9. Put a glass lemonade straw in water in an upright position. Then put one finger over the upper end of the tube, and lift the tube from the water. Air pressure pushing up on the water in the straw keeps the water from falling out. Remove your finger from the upper end of the straw. What happens?

10. Make a fountain in a bottle according to the plan shown above. Of course this

fountain is really nothing but a self-starting siphon. There should be about an inch of water in the bottle.

Answers:

6. (1) with (e). (2) with (f).

- | | |
|---------------|----------------|
| (3) with (b). | (7) with (h). |
| (4) with (a). | (8) with (j). |
| (5) with (g). | (9) with (c). |
| (6) with (i). | (10) with (d). |

UNIT SEVEN

Green Plants as Starch and Sugar Factories

Main Understandings

1. We are absolutely dependent upon green plants for food.
2. Only green plants can manufacture starch and sugar from carbon dioxide and water.
3. Plants can manufacture starch and sugar only in the presence of sunlight, or the right kind of artificial light.
4. Plants throw away oxygen as waste during the manufacture of starch and sugar, and so serve to keep the supply of oxygen in the air from becoming exhausted.

The World's Most Wonderful Factories

A world without green plants would be a world without people! This is true because people could not possibly live on a diet of salt and water, and there would be no other food if there were no green plants. Of course, we do not get all that we eat directly from green plants, but if you trace any food far enough, you come to green plants. Butter, for example, doesn't come directly from green plants, but it does come from milk from cows, and they depend directly upon green plants for food.

Two of the food materials which we get directly from green plants are starch and sugar. If you scrape off a bit of potato and look at it under a microscope, you see grains of starch. All of our cereals and many of our vegetables are among the plants which furnish us with starch. You do not need to be told that fruits furnish us with sugar. There is sugar, too, in many vegetables where you may not expect to find it, and of course we derive large quantities of sugar from sugar cane and maple trees.

From where do the starch and sugar which we find stored in these plants come? Everything which a plant makes must come originally from the air or from the soil. Sugar and starch cannot be found naturally in either the soil or the air. If they could be found in either of these places, we might get them for ourselves from the soil or the air, instead of from plants.

The answer to the puzzling problem of where the plants get the starch and sugar which they store is that green plants *make* these food materials from materials which they can get from the soil and from the air. In the so-called starch and sugar factories, starch and sugar are merely obtained from plants and are put in packages for sale. Green plants are the *real* starch and sugar factories.

To inspect a real starch or sugar factory you need a microscope, for many of the interesting parts of the plant factory cannot be seen without a microscope. A potato plant is an excellent example of a starch factory. Let us find out something about this factory and the work which is going on in it.

With a microscope we find that this factory is divided into rooms, just as are most factories. The rooms, however, are very, very small. Scientists call them cells. They are much too small to be seen without the help of a microscope. Most of the work of making starch is going on in the cells of the leaves. In most of the leaf cells, as well as in some of the cells of the stem, there are little green bodies which we may think of as the machines which do the work. To these "machines" the needed materials must be brought from the soil and the air to be made into good food. We find that the plant first makes sugar, and then changes it into starch for storage. We see in the skin of the leaf tiny "doors" through which the air enters, so that the plant may take from it what it needs. We find "pipes" which lead from the roots up through the stem and to all parts of the leaves, so that the plant may get what it needs from the soil.

This plant factory shuts down at night, just as do most man-made factories. The setting of the sun is like the turning off of the current in a factory whose machines are driven by electric motors.

While this plant factory is making starch and sugar, a waste product is formed that is given off into the air and that we need as much as we need the food the plant makes.

In this potato factory, starch is stored in underground storage rooms, which are really parts of the underground stem. As more and more starch is made by the plant, the storage space underground is made larger, to take care of it. When this factory is closed for the

season, it is destroyed except for the "tubers," or potatoes, the parts of the underground stem in which the starch is stored.

An apple tree is a factory very much like the potato plant factory, except that sugar is stored in the storage rooms instead of starch, and these storage rooms are not underground.

In fact, all green plants are alike in that they can make starch and sugar; they must have light in order to work, they all use the same materials, and they throw off the same material as waste.

It may seem queer that when scientists know much about how green plants make starch and sugar, they cannot yet make starch and sugar from these materials as easily as plants can. Many scientists have tried over and over again, and some of them have been able to carry out certain steps in the process. In time we may be able to buy starch and sugar which have been made entirely in man-made laboratories rather than in plants, but until that time, we shall have to depend upon corn, potatoes, apple trees, sugar cane, and other green plants for the starch and sugar which we need.

Study Outline

[Numbers refer to pages in THE WORLD BOOK Encyclopedia. Articles starred (*) are to be read in full.]

I. Our Absolute Dependence upon Green Plants. See PLANT (Importance of Plants, 5647); BOTANY (The Contribution of Botany to Human Welfare, 889-890); MUSHROOM (How the Mushroom Gets Its Food, 4755); ANIMAL, 289; BIOCHEMISTRY (Derivation of Energy, 743).

1. How can we argue with reason that farmers and gardeners are really the most important members of human society?
2. Make a list of everything you had to eat for dinner yesterday. Show that without green plants you could not have had anything on your list with one possible exception.
3. What is the chief difference between plants and animals? 289, 743
4. What are carbohydrates? 889
5. Of what importance are carbohydrates?
6. Why are we absolutely dependent upon green plants for food?
7. Do all plants make starch and sugar? 3913
8. Many of us like mushrooms. If there were no green plants on earth, why couldn't mushrooms furnish us with food? 4755
9. Of what importance is it that people should know a great deal about the manufacture of starch and sugar in plants?

II. The Manufacture of Starch and Sugar.

See STARCH*, 6809; SUGAR, 6906-6911; OXYGEN (How Oxygen Supports Life, 5281-5282); CARBONIC ACID GAS (Interchange between Plants and Animals, 1193); BOTANY (The Contribution of Botany to Human Welfare, 889-890); CHLOROPHYLL, 1406; LEAVES (The Work of the Leaf*, 3913-3915; How the Leaf Is Made, 3912); BIOCHEMISTRY (Photosynthesis, 743; Conversion of Carbonic Acid, 743).

10. In what sense is the factory pictured on page 6911 not a real sugar factory?
11. Does the large picture on page 6907 show a real sugar factory?
12. How fully do scientists understand the process by which starch and sugar are made in green plants? 743
13. What are the raw materials which the plant factory uses in making starch and sugar?
14. What furnishes the energy needed for the factory?
15. What is the by-product of the making of starch and sugar?
16. As a rule, in what part of the plant is most of the starch- and sugar-making carried on?
17. What is the green coloring matter in plants called?
18. How do the materials which plants need for making starch and sugar get to the leaf?
19. Is carbon dioxide a liquid, a solid, or a gas when it enters the plant? 1193
20. How much carbon dioxide, on the average, is there in air?
21. All animals breathe out carbon dioxide. Why isn't there, therefore, a great deal of carbon dioxide in the air?
22. From what other sources besides animals does carbon dioxide get into the air? 1193, 743
23. If all the carbon dioxide in the air were used up, what would happen? Why?
24. "The pores in the skin of a leaf are doors through which water is supposed to enter the leaf." Why is this statement untrue?
25. Is all the water which a plant takes in used in making starch and sugar?
26. All animals need oxygen. Why isn't the supply of oxygen in the air exhausted? 1193, 3913
27. What part of the air, on the average, is oxygen? 5281
28. Why do green plants always throw away oxygen? 3913
29. Why can't plants make starch and sugar at night?

Things to Do

1. Put a drop of iodine solution on a slice of raw potato. (This iodine solution may be obtained from any drug store; it is called tincture of iodine.) The blue color which you see shows that there is starch in the potato. Put a little corn starch in a test tube. Add water and a drop or two of the iodine solution. Notice the color.

2. By testing with iodine, find out whether or not tapioca, rice, wheat flour, gelatine, and apples contain starch.

3. Test apple for sugar by boiling a small piece in water to which a few drops of Fehling's solution has been added. (Fehling's solution may be obtained at a drug store.) What color results? This color shows the presence of sugar.

4. Test onions, orange juice, and potatoes for sugar.

5. Heat a small amount of dry corn starch in a test tube. Notice the black material left in the test tube. This is carbon. It came from the carbon dioxide which the plant used in making starch. Notice, too, the drops of water which appear on the sides of the test tube.

6. Dissolve a teaspoonful of baking soda in about a fourth of a tumbler full of water. Add two or three teaspoonfuls of vinegar. The bubbles which arise are bubbles of carbon dioxide, the gas which plants take from the air in making starch and sugar. Hold a lighted match in the upper part of the tumbler. What

happens? Carbon dioxide is a good fire extinguisher.

7. Fill a test tube or a tumbler about one-third full of limewater, which may be bought at a drug store. Through a lemonade straw blow your breath into the limewater. Notice that the limewater becomes milky. This shows that you are breathing out carbon dioxide.

8. By means of a wire, lower a lighted candle into a bottle. Cover the bottle. When the candle goes out, remove it from the bottle and pour limewater in the bottle. Shake the limewater and notice that it becomes milky. This shows that the candle, when it burns, gives off carbon dioxide.

9. If you have an aquarium in which some water plants are growing, set the aquarium in the sun, and watch for bubbles to rise from the plants. The bubbles are bubbles of oxygen which the plants are throwing away as they make starch and sugar.

10. If you have a microscope, mount the leaf of a small water plant on a glass slide and examine it with your microscope. Can you see the cells, and the small green dots in the cells? If the leaf is thin, you should be able to do so.

Examine a few grains of starch from a potato with your microscope.

Remove a small piece of skin from the leaf of some such plant, as a paper white narcissus, and examine it with your microscope. Can you find any pores?

UNIT EIGHT**Adaptations of Animals to Their Environment****Main Understandings**

1. Many animals show marked structural adaptations to their environments.
2. Protective coloration is an important phase of adaptation to environments.
3. Many animals have well-developed habits which help to adapt them to the environments in which they live.

How Animals are Fitted for Their Environment

"As lost as a fish out of water" is an old saying, and a very useful one, when we are trying to describe something which is in altogether the wrong surroundings. Although some fishes have been known to climb upon bushes near the water's edge, nothing could be more out of place than the ordinary fish out of water. In fact, a fish out of water is so very much "lost" that, as a rule, it can live for only a very short time. However, a fish out of water is no more out of place than a camel would be in the middle of the sea.

If you were asked to make a list of the ways in which a fish and a camel are alike, you might think at first that you could find no ways. Studying these animals, however,

would show that they are alike in many ways. Both of them have backbones—there are thousands of animals without backbones. Both have brains. Both have heads and tails. Both have ears and eyes. They have hearts, and blood which their hearts pump through their bodies. They both have skin and muscles. Both have stomachs. They do many of the same things. They move about from place to place, they eat, and they breathe. This list of ways in which these animals are alike might be made very long.

Of course there are many ways in which a camel and a fish are not alike. They differ markedly in shape. A camel has legs instead of fins. A camel is covered with hair, while a

fish, as a rule, is covered with scales. A fish has gills, while a camel has lungs for breathing. A fish has eyes, as a camel has, but no eyelids. A camel has special devices for storing water; the ordinary fish has none. A fish has nostrils, but they are of no use in breathing. There are other ways, too, in which these animals differ.

It is easy to see one reason why a fish and a camel should differ in so many ways: the fish is fitted for living in the water, and the camel is fitted for living in very dry regions on land.

As we look about us, we see many ways in which animals are specially fitted for the surroundings in which they live. These ways in which animals are specially fitted for living in the surroundings where they are found are called adaptations to environment. We find that some animals are fitted for living in water, others on dry land, and still others in the air. We find that some animals are able to live where it is very cold, while others are fitted for living where it is very warm. Some animals are fitted for living in very dry regions, while others can thrive only where there is much moisture. Some water animals are fitted for living where there is little pressure, others where the water pressure is terrific. All animals must have food, water, and oxygen, and different animals are fitted for getting these necessities of life under differing conditions.

One of the very striking ways in which an animal may be fitted for living in a particular environment is its color. Some animals are so colored that they look very much like their surroundings. If an enemy fish swims under a trout, for example, the light underside of the trout does not look very different from the sky. To an enemy bird flying overhead, the trout looks much like the pebbles at the bottom of the water. If the colors of this fish were reversed, what a plain target it would be for its fish and bird enemies! Many other animals are equally well protected by their colors.

An animal which seems very conspicuously colored when we take it away from its home may be very hard to see in its natural surroundings. A polar bear in a zoo stands out very clearly, but a polar bear on a cake of ice in the arctic regions is not easily seen.

Most remarkable among the animals whose color helps fit them for their surroundings are the animals which change color. Many of the changes in color are seasonal changes. Think how much better the weasel fits into its surroundings than it would if it stayed the same color the year round. Even more remarkable are the animals which change color quickly, as the chameleons do.

There are many animals which live parts of their lives in one set of surroundings but which are not fitted for living their whole lives in those surroundings. The body of the mos-

quito, for example, changes as the mosquito ceases to be a water animal and becomes an animal of the air.

Some animals which are very well fitted for living in certain regions during one season of the year, may not be well fitted for living in those surroundings in another season. Certain animals have solved this problem by traveling from place to place to find suitable conditions. Others have solved it by sleeping during the unfavorable season. Seasonal migration and hibernation are only two of the many habits which help fit animals for their environment.

Study Outline

[Numbers refer to pages in THE WORLD BOOK Encyclopedia. Articles starred (*) are to be read in full.]

- I. Ways in Which the Bodies of Certain Animals Are Specially Fitted for the Surroundings in Which They Live. See ENVIRONMENT (Adaptation to Environment, 2275; Man and Adaptation, 2276); GILLS*, 2808; LUNGS, 4154; OCEAN (Plant and Animal Life), 5150; PROTECTIVE COLORATION*, 5850-5851; BADGER, 570; BAT, 647; BIRD (Framework of the Body, 751; How Birds Breathe, 751; Flight, 751-752; Feathers, 752); CAMEL*, 1103-1106; CHAMELEON, 1299-1300; ERMINE, 2290; FISH, 2440-2444; FROG*, 2625-2626; FLYING SQUIRREL, 2504; FUR, 2638; FLOUNDER, 2486; GIRAFFE, 2811-2813; GRASSHOPPER, 2914; ICHTHYOSAURUS, 3336; LEAF INSECT*, 3903; MOLE, 4575; MONKEY (Monkeys at Home), 4596; MOSQUITO (A Mosquito's Biography, 4675; Life History of the Mosquito, 4677); PTARMIGAN, 5869-5870; SEAL (What a Seal Looks Like, 6465; Where Seals Live, 6465; The Fur Seal, 6466); SLOTH*, 6643-6644; SNAIL, 6657-6659; SQUID, 6788; TREE FROG, 7261-7262; TROUT, 7276; WALKING STICK*, 7582; WATER BEETLE, 7665; WEASEL, 7686; WHALE, 7726-7730.

1. In what ways is the camel fitted for life in a desert? 1104, 1105
2. How long can the camel travel, as a rule, without drinking? What enables it to do this?
3. Why is a camel's hump lean and shrunken at the end of a hard journey?
4. What do we mean by the phrase, "the survival of the fittest"? 2275
5. What animal has been most successful in adjusting himself to different kinds of surroundings? 2276
6. How does being boat-shaped help a fish? 2440
7. What serves as a fish's propeller? How does a fish guide itself?

8. Are all fish fitted for living in exactly the same environment? 2442
9. Can you see any reason for a flounder's having both eyes on the same side of its head? 2486
10. How does a fish "breathe"? 2486
11. Why would the squid's ink bag be an equally effective means of protection on land? 6788
12. Animals with gills are fitted to live where? 2808
13. What is an amphibian? 266, 2625
14. How does a tadpole breathe?
15. How does a full grown frog breathe?
16. In what ways are most birds specially fitted for a life in the air? 751
17. How do the feathers of warm-climate birds differ from the feathers of birds of colder regions?
18. What is the reason for the saying, "runs off like water from a duck's back"? 751
19. To what parts of our bodies do the wings of birds correspond?
20. How does the giraffe's long neck help to make it possible for this animal to live on dry plains where there is likely to be little grass? 2811
21. Of what help is it to a giraffe to have nostrils which can be closed?
22. How do you account for the fact that the ichthyosaurus, although a reptile, looked very much like a fish? 3336
23. Whales are fitted for living in what sort of environment? 7726
24. Do you think that a whale is as well fitted for living in the ocean as is a codfish? Why, or why not? 7729
25. What serves to keep the whale warm in the cold Arctic seas?
26. What ability of the whale to adjust himself to his environment puzzles scientists?
27. With what organ does a whale breathe?
28. With what organs do you breathe? 4154
29. In what ways are water beetles specially fitted for living in the water? 7665
30. What are phosphorescent fish? Where are they fitted for living? 5150
31. If you should bring a deep-sea fish to the surface of the water, what would happen? Why?
32. For what sort of environment is the brook trout fitted? 7276
33. When and where are the best furs obtained? Why? 2638
34. Are bats birds? What makes some people think that they are? 647
35. In what way are monkeys specially fitted for living in trees? 4596-4597
36. Where do most seals live? What

37. Has a live seal the beauty and gloss of a sealskin coat?
38. Where do mosquito larvae live? How do they breathe? How do they get their food? 4675, 4677
39. Where do full-grown mosquitoes live? How do they get their food?
40. How is the sloth specially fitted for living where it does?
41. How are tree frogs able to cling to smooth bark? 7262
42. How are moles fitted for living a large part of their lives underground? 4574
43. Do all snails live in the same kind of environment? Explain. 6658
44. In what way are a squid and a tree frog like a chameleon? 7261, 6788, 1299-1300
45. How can we account for the brilliant colors of tropical fishes? 2441
46. How do the little green plants which grow in the hair of the sloth help it? 6644
47. Why should two pictures of each animal pictured be given on the color plate opposite page 5850?
48. Why is one of the butterflies of India called the "dead leaf" butterfly?
49. How do scientists explain the fact that most animals of the desert are mottled-gray or grayish-brown?
50. Did the ancestors of the goldfish in our aquaria differ in color from our goldfish? Which would be better fitted for living out of doors in natural surroundings? 2862
51. Does the ptarmigan change color in the same way that a chameleon changes color? 5869-5870, 1299-1300
52. How do the colors of the viceroy butterfly help protect it? 5851
53. Can animals change their colors whenever they wish to do so? How, then, do scientists explain the fact that so many animals match their environment in color?
54. Where does a flying squirrel live? Of what color is it? 2504
55. Where are leaf insects usually found? Why is it difficult to see one? 3903
56. Why have most of the ermines which have been killed for their fur been killed in the winter time? 2290
57. What does the badger do to avoid fighting? 570
58. In what way are the walking sticks remarkable?
59. How do grasshoppers escape from their enemies?

60. What does the illustration on page 7686 show?

II. Habits Which Help Fit Animals for Their Environment.

See ANIMAL (Migration of Animals), 291; BEAR (Winter Habits, 660); Kinds of Bears, 660-661; CAMEL, 1104; DORMOUSE, 2013; GROUND HOG, 2968-2969; HIBERNATION, 3172-3174; LUNGFISH, 4154; PRAIRIE DOG, 5795; SALMON, 6334; SQUIRREL, 6788-6790.

61. How did the dormouse get its name? 2013
 62. What does the word "hibernation" mean? 3172
 63. What is the usual food of hibernating animals?
 64. What are animals trying to avoid when they hibernate?
 65. Does the chipmunk sleep continuously throughout the winter?
 66. Why should animals be thin after hibernating?
 67. Why may the rude awakening of a hibernating animal cause death?
 68. Does the polar bear hibernate? What does the polar bear eat? What have these two facts to do with each other? 661
 69. How does a bear's hibernation differ from that of a snake?
 70. Does the badger hibernate? Why? 570
 71. How does the chipmunk get its food during its long stay underground? 1403
 72. Where does the ground hog spend the winter? Does it lay stores of food for winter use? 2969
 73. How do squirrels prepare for winter? 6789
 74. How does the lungfish prepare for the dry season? 4154
 75. What enables the camel to brave the terrible sand storms of the desert? 1104
 76. How does the prairie dog prevent its home from being flooded during heavy rains? 5795
 77. Name four animals which migrate at the approach of cold weather. 291
 78. What do salmon do in order to find the right environment in which their eggs may be hatched? 6334

Things to Do

1. Draw a picture of a goldfish. Your drawing should show at least four ways in which a goldfish is fitted for living in the water.
2. List five ways in which a bird and a fish are alike.
3. List five ways in which a bird and a fish are different. Does adaptation to environ-

ment explain the differences you have listed?

4. Each word or phrase in the first column should suggest one of the animals named in the second column. Copy the two columns. Draw lines connecting the words or phrases in the first column with the names of the animals they suggest.

Wings but no feathers	Monkey
A house on its back	Whale
A body shaped like a twig	Tree frog
A white winter coat	Ermine
Blubber	Walking stick
A tail which serves as another hand	Snail
Toes with sucker pads at the ends	Fish
Fins	Bat

5. A Jumbled Letter Puzzle. Arrange each of the following groups of letters to spell the name of an animal which hibernates:

- a. R A B E
- b. R G O F
- c. P E R H O G
- d. R E D B A G
- e. R E Q U I R L S
- f. S O M E R O D U

6. One of the following words is omitted from each of the sentences below: Migrates, migrations, environment, hibernates, hibernation. Put the right word in each blank.

The word _____ means surroundings.

The seasonal journeys of the codfish are called _____.

A long winter sleep is called _____.

The ground hog _____.

The caribou _____.

7. Draw a picture in color of a walking leaf insect, to show how the insect matches its environment.

8. Another Puzzle. When the names of the animals described below are written in order, the initial letters will spell the name of the animal sometimes called the "ship of the desert."

- a. A lizard remarkable for its ability to change its color.
- b. A fish which migrates to fresh water to lay its eggs.
- c. A hoofed animal of the far north.
- d. An animal which changes color with the seasons.
- e. A fish which makes itself a cocoon in which to spend the dry season.

9. Make a puzzle similar to the one given above.

10. Find out about the "suicide" migrations of the lemmings of Norway and Sweden.

Answers:

4. Wings but no feathers suggests Bat
 A house on its back " Snail
 A body shaped like a twig Walking Stick

A white winter coat suggests	Ermine	c. GOPHER.	e. SQUIRREL.
Blubber	Whale	d. BADGER.	f. DORMOUSE.
A tail which serves as another hand	Monkey	6. environment.	hibernates.
Toes with sucker pads at the ends	Tree frog	migrations.	migrates.
Fins	Fish	hibernation.	
5. a. BEAR	b. FROG.	8. a. Chameleon.	d. Ermine.
		b. Alewife.	e. Lungfish.
		c. Muskox.	

UNIT NINE

The Place of Our Earth in the Universe

Main Understandings

1. The earth is a member of the solar system, which consists of the sun and the bodies that travel in space around the sun.
2. The revolution and rotation of the earth give us our basic units of time.
3. Many of our common phenomena are caused by the movements of the earth and the moon.
4. Our solar system is an extremely small part of the known universe.

The Sun's Family, and Its Place among the Stars

Do you like to travel fast? Would you like to travel two hundred times as fast as the fastest airplane can fly through the air? Whether you think you would like to do it or not, you are doing it; at this moment you are traveling at the rate of somewhat more than a thousand miles a minute. The earth is going at this tremendous speed in its journey around the sun, and, of course, as it hurls itself through space it is carrying you with it. While you have been reading this paragraph, you have traveled at least three hundred miles.

Surely you knew that the earth travels around the sun, but its speed may have surprised you. It may surprise you, too, to know that the earth is only one of a family of planets which travel around the sun. Mercury, Venus (the earth's twin), Mars, the giant Jupiter, Saturn with its marvelous rings, Uranus, Neptune, and Pluto belong to the sun's family, too, and journey around the sun without ceasing. Some travel faster than the earth; others more slowly. What a tremendous collision if the earth should run into one of the other planets! But there is no danger that it will. Each planet has its own path and the paths of the planets do not cross one another. Even distant Neptune, so far away that if you could travel to it in the fastest airplane you could not reach it for several thousand years, is kept in its path by the same forces which keep the earth in its path.

The planets are not the only members of the sun's family. There are moons which travel around the planets as the planets travel around the sun; little planets, called planetoids or asteroids; meteors; and meteorites, which we call shooting stars when they come close enough to us to become white hot as they fall

through the air; and comets, which remain much of a mystery even to our best scientists. The sun and all the planets, moons, meteors, meteorites, planetoids, and comets which travel around it form the "solar system."

Unless you picture everything in the solar system as moving at a terrific speed, you haven't an accurate picture of the sun and its family. The earth not only travels around the sun, but it turns on its axis as it travels. Moreover, the whole solar system is shooting through space. Suppose you were spinning a top on a train bound for California. The top would be turning on its axis, it would be traveling about on the floor, and at the same time it would be going toward California. Thinking of that top may help you to understand the movements of the earth. Without understanding something of the movements of the members of the solar system, we cannot understand many of our ordinary happenings: the rising and setting of the sun, moon, stars, and planets; tides, eclipses, change of seasons, and the apparent changes in the shape of the moon. The movements of the earth have given us, too, our important units of time, the day and the year.

A scientist once called the earth a "second-rate planet of a second-rate sun." This scientist was thinking only of size. Four of the planets in our solar system are much larger than the earth. But how can he call the sun a second-rate sun? It is more than a million times as big as the earth. Is there anything bigger? The answer is that many of the stars are larger. Stars are suns much like our own sun. Although many of them are larger than our own sun, they are so far away that they look small. For all we know, many of these stars may be the centers of solar systems like our own. The stars are so far away that the distance from the sun to Neptune is just a

step compared with the distance to the nearest star. Huge as our solar system is, it is a very small part of the universe. We can easily understand why a Chinaman in a recent story was made to say, as he looked up at the sky, "I feel like one tiny grain of sand."

Study Outline

[Numbers refer to pages in THE WORLD BOOK Encyclopedia. Articles starred (*) are to be read in full.]

I. The Sun's Family. See SOLAR SYSTEM*, 6679.

A. The Sun, the "Center" of the Family.

See THE STORY OF THE SUN*, 6921-6924; SPECTROSCOPE, 6749; SPECTRUM ANALYSIS, 6748-6750; LIGHT (The Spectrum), 3998.

1. If a model of the sun were made as large as a tennis ball, how large should the model of the earth be made? 6921
2. How long would it take the sound of an explosion on the sun to reach the earth if it were possible for it to travel through the space between the sun and earth? 6921
3. How much would you weigh on the sun? 6922
4. How much ice could the concentrated rays of the sun melt in one second? 6922
5. Sometimes dark spots may be seen on the sun by looking at it through a piece of smoked glass. What is the nature of these spots? 6922, 6923
6. Do sunspots have any influence on the earth? 6924
7. Does the sun turn on its axis? 6922
8. What substances found on the earth are known to be in the sun, too? How do scientists know this? 6922, 3998, 6748-6750

B. The Planets, the Big Brothers and Sisters of the Sun's Family. See

- PLANET*, 5643-5645; EARTH, 2082; GRAVITATION, 2916; CENTRIFUGAL FORCE, 1289; HERSCHEL, 3167-3168; JUPITER*, 3720-3721; MARS*, 4301-4302; MERCURY*, 4406-4407; NEPTUNE*, 4878-4879; SATURN*, 6398-6399; URANUS*, 7420; VENUS*, 7488.
9. How can one tell a planet from a star if he does not have a telescope? 5643
 10. Why do the planets not go wandering off into space away from the sun? 2916
 11. Why do they not fall into the sun? 1289

12. Which is the largest planet, and which the smallest? 5643
13. Which planet has the longest year, and which has the shortest? 5643
14. What are the rings of Saturn? 6398
15. What planet did Sir William Herschel discover? 3167-3168
16. How was Neptune discovered? 4879, 7420, 470
17. Give the most striking facts about each of the known planets. 2082, 3720-3721, 4301-4302, 4406-4407, 4878-4879, 6398-6399, 7420, 7488
18. Do scientists know how long each planet's day is? How do they discover this?
19. On which planets might life possibly exist?
20. Do astronomers think that Mars is inhabited? 4302

C. The Lesser Members of the Sun's Family. See ASTEROIDS*, 463-464; COMET*, 1581-1582; METEORS*, 4419-4421.

21. How many asteroids are known? 463
22. How are asteroids discovered? 464
23. What does a comet look like? 1591
24. How would you tell a comet from a meteor? 1591, 4419
25. What would happen if the earth ran into a comet? 1582
26. Why do many meteors disappear before they reach the earth?
27. What damage do meteors do on the earth? 4421.
28. What are shooting stars? 4419.

D. The Planets' Families of Moons. See MOON*, 4638-4642; SATELLITE, 6307; SOLAR SYSTEM, 6679; JUPITER (Satellites of), 3721; GALILEO, 2665; TELESCOPE, 7081.

29. Which planet has the most moons, and which ones have none so far as we know? 6397
30. How does our moon compare in size with the moons of other planets? 4643, 468
31. "Moonlight is really second-hand sunlight." Why is this true? 4640
32. If a man could be shot to the moon in a rocket, would he be able to explore it? Why or why not? 4638, 4640
33. For what are the satellites of Jupiter noted? 3721

34. What did Galileo discover about our own moon? 2665
35. Why do you think Galileo was first to discover satellites of any planet other than our own? 7081

E. Early Ideas of the Solar System and How They Changed. See PTOLEMY, CLAUDIUS PTOLEMAEUS, 5871; COPERNICUS, 1666.

36. Did Ptolemy believe that the earth traveled around the sun, or that the sun traveled around the earth? 5871
37. What mistakes did Ptolemy make in his list of planets? 5871
38. Why were not Neptune and Uranus included in his list?
39. How did Copernicus change scientists' ideas of the solar system? 1666

II. How We Are Affected by the Movements of the Earth and the Moon.

A. Time. See CALENDAR, 1075-1077; DAY, 1842-1843; EARTH (The Earth as a Clock), 2082; STANDARD TIME, 6799-6800; SUNDIAL, 6927; TIME, 7179-7180; YEAR, 7930.

40. What are the two units of time from which all others are made? 1075
41. Which motion of the earth has given us the first unit you have named? Which motion has given us the second? 1842, 7930, 7179
42. How do astronomers get the exact time? 2082
43. Why must we have leap years? 7930
44. What is the advantage of a system of standard time? 6799
45. What would be the advantages of the new calendar which has been suggested? 1077
46. Does a sun-dial always give correct time? Explain fully. 6927

B. Phases of the Moon. See MOON (Orbit, Size, and Distance, 4638; Phases of the Moon, 4640-4642).

47. Why does the moon seem to change shape? 4640
48. Why can we not see the actual "new" moon? 4640
49. When the moon is full, what are the relative positions of the earth, sun, and moon? 4640
50. How long a time is it from one new moon to the next? 4638

C. Eclipses. See ECLIPSE, 2094-2097; CORONA, 1694.

51. What causes an eclipse of the moon? 2095
52. How long may a total eclipse of the moon last? 2095
53. At what phase of the moon may it be eclipsed? 2095
54. What causes an eclipse of the sun? 2096
55. How long may a total eclipse of the sun last? 1694
56. What is the difference between a total eclipse and a partial eclipse of the sun? 2096
57. What part of the sun is studied by astronomers during total eclipses? 2096, 1694

D. Tides. See AMAZON RIVER, 242; BORE*, 865; FUNDY, BAY OF, 2636; GRAVITATION, 2916; TIDES*, 7171-7172.

58. Which two heavenly bodies help cause the tides? 7171, 2916
59. Which motion of the earth causes the tides to rise and fall at any city on the ocean? 7172
60. Why are the tides not always the same height? 7172
61. How do tides help man? 7172
62. How may tides be a hindrance to man? 2636, 865, 242
63. Are there tides in lakes? What evidence have you?

E. Apparent Movement of Heavenly Bodies. See ASTRONOMY, 468; SUN, 6922; STAR, 6806.

64. What movement of the earth accounts for the rising and setting of the sun, moon, planets, and some of the stars? 6806
65. What is the apparent movement of the Big Dipper? 468
66. What causes this apparent movement? 468
67. Does the north star rise and set? What causes this?
68. What accounts for the apparent northward and southward movements of the sun in our sky? 6922

F. Seasons. See SEASONS, 6742.

69. What has the traveling of the earth around the sun to do with the seasons? 6742
70. If the earth's axis were not tipped, what would the effect be on the change of seasons?

III. Our Solar System in the Universe.

A. Stars. See STAR*, 6804-6809; ANTARES*, 305; BETELGEUSE*, 722; ASTRONOMY, 468-478; FIXED STARS*,

2448; SIRIUS*, 6626; CONSTELLATION*, 1629.

71. With what member of our solar system can stars best be compared? 6804, 468
72. How does Betelgeuse compare in size with our solar system? 722
73. Are the stars really "fixed"? 6805, 2448. How do we know?
74. What is the largest star known? 305, 6808
75. What is the brightest star? 6626
76. What do we mean when we say that Rigel is a star of the first magnitude? 6806
77. What is a constellation? 1629, 473
78. Why will the constellations change? 6806
79. What is the brightest constellation? 474

B. Star Distances. See ASTRONOMY (Distances That Defy the Imagination*), 469-470; UNIVERSE, 7414

80. A light year is how many miles? 7414
81. Why is the light year used in measuring star distances? 470
82. How long would it take an airplane flying at the rate of one hundred miles an hour to fly a light year?
83. How far away is the nearest star beyond the sun? 470
84. How far away is the nebula of Andromeda? 470
85. How is it possible that we may see some stars which have ceased to exist? 470

C. Our Universe. See MILKY WAY*, 4485; NEBULA, 4867; STAR (Stars in Space), 6805.

86. What is the real nature of the Milky Way? 6805, 4485
87. How many stars are there in our stellar universe? 6805
88. How large is our stellar universe? 4485
89. Where is our solar system in this universe? 4485
90. At what speed is our solar system moving through the universe? 6805
91. What is the nebula of Andromeda? 4867, 6805

Things to Do

1. Make a model of the solar system. Make a plasticine model of the earth $\frac{1}{4}$ inch in diameter. Make plasticine models of the other planets on the same scale. Use very tiny balls of plasticine to represent the moons and the planetoids. Make a cardboard circle to repre-

sent the sun. Why not make the model of the sun of plasticine?

2. Play the "Name on the Back" game with names of heavenly bodies. Pin the name of some heavenly body on the back of the person who is "it." If this person can guess in twenty questions what heavenly body is named, he chooses the next person to be "it," and pins a name on his back. If he cannot guess in twenty questions, he must be "it" again. The questions must be questions which can be answered by "yes" or "no."

3. If you could travel to the sun for three cents a mile, how much would it cost you to get there?

4. Match these parts of sentences so that you have five accurate statements:

- | | |
|-------------------------------------|--|
| a. The change of phases of the moon | a. never rises nor sets. |
| b. Sun spots | b. are supposed to be fragments of heavenly bodies. |
| c. The north star | c. is much larger than the earth. |
| d. Meteors | d. are caused by the traveling of the moon around the earth. |
| e. Jupiter | e. are more numerous at some times than at others. |

5. **A Puzzle.** When you have guessed correctly the names of the heavenly bodies described below, and have written the names in order, the initial letters will spell the name of a well-known constellation.

- a. The first star group beyond Neptune that anyone can see. 469
- b. The eighth planet from the sun.
- c. The brightest star of the Great Bear. 472
- d. A first magnitude star in the constellation Orion. 473
- e. The brightest constellation in the sky. 474
- f. The smallest planet of our solar system.
- g. One of the planetoids. 464
- h. The common name for Sirius.
- i. A brilliant star in The Scorpion. 472

6. Consult the star maps on pages 472 and 473 to find what constellations will be visible to-night. List five of these constellations, and try to find them to-night.

7. Write a story of an imaginary trip to the moon. Be sure, in your story, to describe conditions on the moon as they actually are.

8. **Another Puzzle.** The initial letters in this puzzle spell the name of the planet which Herschel discovered.

- a. "The works of creation taken as a whole." 7414
- b. A star in The Lion. 472
- c. A brilliant star in The Bull. 473
- d. The name given to huge masses of

- gaseous matter among the stars. 4867
 e. A constellation near Orion. 473
 f. The brightest star with the exception of the sun. 474

9. Make a sky puzzle similar to the one given above.
 10. Arrange the letters in each of the following groups to spell the name of a famous astronomer:

- a. P E R L E K
 b. A I L L O G E
 c. S U P E R I N C O C
 d. M O P T Y L E
 e. H E A R B
 f. C H E E R S H L

Answers:

- | | |
|-------------------|-------------|
| 4. a and d | d and b |
| b and e | e and c |
| c and a | |
| 5. Alpha Centauri | Mercury |
| Neptune | Eros |
| Dubhe | Dog Star |
| Rigel | Antares |
| Orion | |
| 8. Universe | Nebulae |
| Regulus | Unicorn |
| Aldebaran | Sirius |
| 10. a. Kepler | d. Ptolemy |
| b. Galileo | e. Brahe |
| c. Copernicus | f. Herschel |

UNIT TEN

Seeds and Gardening

Main Understandings

- Most of our cultivated plants are seed plants.
- A seed contains a tiny plant and food for that plant.
- Pollen and ovules are necessary for seed formation.
- For germination seeds require warmth, air, and moisture.
- Cultivation is an important part of gardening.
- Hybridization is one way of getting new kinds of plants.

What Every Young Gardener Should Know

If you were asked to name ten useful plants, it is very probable that every one you named would belong to that great group of plants which produce seeds. There are many, many kinds of plants which cannot produce seeds, but almost all of the plants which men have found to be worth cultivating are seed plants. Thus, although mosses, ferns, and other seedless plants are sometimes found in gardens, gardening is largely a matter of planting and caring for seed plants.

The fact that a plant is a seed plant doesn't mean in all cases that the plant can be raised only from seeds. Geraniums and tulips, for example, are seed plants, but the first can be raised easily from cuttings, and the latter from bulbs. However, most of our common garden flowers and vegetables must be raised from seed.

If all young gardeners understood what a seed is, they would make fewer mistakes than they do in plantings seeds. Every seed contains two things—a tiny plant and food for that plant. In order to grow, the little plant in a seed needs exactly the same things that a young animal needs—food, water, and air. Gardeners without thinking of the little plants in the seeds, sometimes drown these little plants by filling the soil so full of water that there are no air spaces between the soil particles.

Another mistake often made is to plant seeds at the wrong depth. As soon as a little green plant appears above the surface of the ground,

it is ready to begin making its own food out of carbon dioxide from the air and water and other materials from the soil. Until it is ready to make food for itself, it must depend upon the food in the seed. If such a tiny seed as a sweet alyssum seed were planted three inches deep, the small amount of food in the seed could not feed the plant long enough for it to grow to the surface of the soil. On the other hand, there is much food stored in a bean seed, and there is a distinct advantage in planting it deep; heavy rains might wash the soil away from such a big seed if it were planted close to the surface.

Planting seeds so thickly that the little plants which grow from them are seriously crowded is another common error.

Some young gardeners think that their task is completed when they have planted their seeds. Planting is only one step in gardening. The seedlings which succeed in reaching the surface of the soil have little chance of growing to be strong, healthy plants without the gardener's help in the battle against weed and insect enemies.

Perhaps you are interested chiefly in raising flowers. If so, you may have learned from experience that the flowers of some kinds of plants should be picked frequently, if the plants are to continue to bloom. To understand this, you should know something of the part which flowers or blossoms play in the life of a seed plant. Of course, we raise flowers because they are beautiful, but the plants pro-

duce flowers for themselves, not for us. The purpose of flowers is to produce seeds. If the flowers are not picked, and the seeds are allowed to ripen, there is no longer any need for the plant to bloom.

The flowers of vegetables, although not so beautiful, are just as important to the plants as are the flowers of sweet peas and marigolds, for example. If the plants do not bloom, there will be no seeds from which new plants may grow. Seeds of vegetables are important to us, too. If bean and pea and corn plants did not bloom, there would be no peas or beans or corn for us to eat, since we eat the seeds of these plants. If tomatoes and peppers did not bloom, no red seed-containing fruits would be produced. And of course, if vegetables did not bloom, there would be no seed from which to raise next year's crop. In our gardens we seldom see the flowers of certain kinds of vegetables, because we destroy the plants and eat the parts which we wish before they have reached the stage of blooming.

Knowing how seeds are produced has made it possible for skilful gardeners to create new varieties of plants. A sweet pea, which we may take as an example of a simple flower, has a green calyx made of sepals, a gay-colored corolla made up of petals, stamens with bags full of yellow pollen, and a pistil containing tiny ovules. The pollen and the ovules have the major rôles to play in seed production. This is true of all flowering plants. An ovule grows to be a seed after the contents of a grain of pollen have united with the contents of the the ovule. Grains of pollen must fall on or be brought to the tip of the pistil, so that they can grow down to the ovules.

A gardener who is trying to get a new variety of plant may take pollen from one kind of plant and put it on the pistil of another kind. The seeds produced in this way will contain little plants with parents of two different kinds. When these plants grow, they may differ considerably from both of the parent plants. Crossing two kinds of plants in this way has given us many of our present varieties of flowers and vegetables and some entirely new kinds of plants. The process sounds somewhat simpler than it is, but anyone who understands how seeds are formed may carry on experiments in crossing with some hope of success. Only plants which are closely related can be crossed, however, so there is no hope of your being able to startle the world with a vegetable which is a cross between beans and corn, for instance, which do not belong to the same plant family, or with a new flower which is a cross between a lily and a rose. But there is always a chance of getting new varieties of plants which are better than any plant of the kind which has yet been produced.

Study Outline

[Numbers refer to pages in THE WORLD BOOK Encyclopedia. Articles starred (*) are to be read in full.]

I. The Importance of Seed Plants. See SEEDS, 6479; Use of Seeds, 6481; GRAINS, 2888-2889; FRUITS, 2629; COTTON (In a Cotton Field of the South, 1710-1712); TOBACCO, 7194; ALFALFA, 202; FLAX, 2465.

1. Wheat, oats, corn, cotton, tobacco, alfalfa, apple, orange, rice, and flax are ten important crop plants. How many of them are seed plants? 2888, 2629, 2465, 1710, and 202
2. Name four groups of plants which do not produce seeds. 6479
3. For what purpose are seeds used in greatest quantity? 6481

II. Seeds and How They Are Produced. See SEEDS, 6479-6483; ANGIOSPERMS, 284; BEE (What Is Its Use, 679); BOTANY (Why Plants Need Insects, 884-885); COMPOSITE, 1593; CROSS-POLLINATION*, 1757; FLOWER (Flower Structure, 2491; Variation in Flowers, 2491-2492); GERMINATION*, 2789-2790; POLLEN AND POLLINATION, 5713; WHEAT, 7731.

4. Examine the diagram of a wheat seed on page 7731. What are the parts of a wheat seed?
5. What is the embryo in a seed? 2789
6. What are cotyledons?
7. Where, in a bean seed, is the food needed for the little plant in the seed stored?
8. On what basis are all flowering plants divided into three great divisions? 6480
9. Of what use is the seed coat of a seed?
10. How do you account for the fact that seeds can withstand conditions which would kill most plants? 6479, 6481
11. For how long a time have seeds been known to remain in excellent condition?
12. What do you think is the chief purpose of the illustration on page 6483? Of that on page 6482?
13. What is the real purpose of flowers?
14. Of what use is the calyx of a flower? 2490, 1593
15. What are the separate "leaves" of the calyx called?
16. What purposes do the petals serve?
17. What name is given to all the petals of a flower?
18. Why are the stamens of a flower important? 2491
19. In what place in a flower should you look for the pistil?
20. Of what importance are the ovules?

21. What must happen before ovules can become seeds?
22. Where may ovules be found?
23. What is a composite?
24. Name two common composites.
25. Why is pollination important? 2492
26. What is cross-pollination? 284, 1757, 5713
27. What is self-pollination? 1757, 5713
28. What are nature's chief pollen carriers?
29. What prevents self-pollination in the willow?
30. How is milkweed pollen carried from flower to flower?
31. What do the illustrations on page 5713 show?
32. What insect is the most important pollen-carrying insect?
33. What purpose do the bright colors and sweet scents of many flowers serve? 5713, 284
34. Some flowers are especially fragrant at night. Why should they be?
35. Corn is wind pollinated. Corn produces much pollen. How does one of these facts help to explain the other?
36. On page 884 you will find the paragraph heading, "Why Plants Need Insects." Why do they need insects?
37. Of what importance are wasps to figs?
38. How is the pollen of the gladiolus carried from flower to flower? 5714
39. Why were bumblebees taken from this country to Australia and New Zealand? 679

- III. Gardening. See ANNUALS*, 295; FLOWER (Planting Table for Flowers, 2493); GARDENING (The Site and the Plan, 2684; Getting the Soil Ready, 2685; Planting the Seed, 2685; When to Plant, 2685; What Cultivation Means, 2686; Protecting the Garden, 2686); GERMINATION*, 2789-2790; SEEDS, 6480; VEGETABLES, 7470; WEEDS, 7699-7700
40. What does the word "germinate" mean? 2789
 41. Under what conditions do seeds germinate? 2789, 6480
 42. Why is too much moisture dangerous for seeds?
 43. Do all seeds sprout in the same length of time after being planted? How much variation is there? 2790
 44. What is an ideal location for a garden? 2684
 45. How should the soil be prepared for a garden?
 46. Petunia seeds are very tiny seeds. How should they be planted?

47. What do we mean by "transplanting"? 2686
 48. For what two reasons is it necessary to hoe a garden after the plants have come up? 2686, 2493
 49. What is a weed? 7699
 50. Why are weeds injurious? 2686
 51. What are the two chief enemies of garden plants?
 52. What animals may serve as assistant gardeners?
 53. What is an annual? 295
 54. Name five common garden plants which are annuals.
 55. Some vegetables should be transplanted; others may be sown in the place where they are to remain. From the planting table given on page 7471 find five vegetables which may be planted in your gardens in May and which will not have to be transplanted.
 56. Look at the planting table for flowers on page 2403. Notice that the depth at which the seed should be planted, the distance apart of the rows, and the distance apart of the plants in the rows vary with different flowers.
- IV. Getting New Kinds of Plants by Crossing. See BURBANK*, 1024-1025; BREEDING (Plant Breeding, 940); HYBRID, 3302
57. What is a hybrid? 940
 58. In what way are hybrid plants produced?
 59. What advantages may be gained by crossing two kinds of plants? 940, 3302
 60. What is a citrange? 941
 61. What was gained by crossing the English walnut with the California black walnut? 3302
 62. What was gained by crossing the common pear with the Chinese sand pear?
 63. What was gained by crossing the American grape with the grape of Europe?
 64. For what kind of work is Burbank renowned? 1024
 65. What is Burbank's most famous hybrid flower? 1025
 66. Name four hybrid fruits produced by Burbank.

Things to Do

1. Make a collection of as many kinds of seeds as possible.
2. Take apart a four o'clock seed which has been soaked in water for at least an hour. You will find a heavy outer seed coat, a thin inner seed coat, a tiny plant with two leaves,

and a little ball of food. Examine a bean seed in the way described on page 1719.

3. Make a list of ten vegetables. Tell what part of each plant we eat.

4. A Relay Race. This is a group game. A blackboard is needed for it. The players are divided into two groups of equal size. The leaders of the two groups go to the blackboard. Everyone who has studied about flowers should know the following eight words: Stamens, pollen, pistil, ovules, corolla, petal, calyx, sepal. When the starting signal is given, each leader writes one of the eight words on the board. He then takes the chalk to the next person in order on his side. The second player then runs to the board and, if the leader wrote his word correctly, writes another of the eight words. If a player spells a word incorrectly, the next player must correct the mistake instead of writing a new word. The second player on each side gives the chalk to the third player, and the game continues until one side has succeeded in writing the eight words correctly.

5. With a microscope examine pollen from different kinds of flowers.

6. Make plasticine models of pollen grains of different kinds.

7. Find in a simple flower such as a pansy, tulip, or petunia the calyx, corolla, stamens, and pistil. Take apart a flower head of some such composite as the daisy or dandelion. Examine the separate flowers.

8. Four of the plants named in the following list are seed plants; the other four are not. Look these plants up in *THE WORLD BOOK*, and see which ones are seed plants.

Boston fern.	Horsetail.
Kelp.	Moss.
Marigold.	Wheat.
Onion.	Orchid.

9. Plant a garden of your own. Follow the suggestions given in the article about GARDENING, on pages 2683 to 2687.

10. An Endless Chain of Garden Plants. If the plants suggested by the following phrases are named rightly, the final letter of each name except the last one will be the first letter of the following name. The final letter of the last name will be the first letter of the first name on your list.

- a. A flower created by the genius of Luther Burbank.
- b. A plant whose edible roots resemble sweet potatoes.
- c. A yellow-flowered plant which can be raised easily from seeds in ordinary garden soil.
- d. Another name for larkspur.
- e. A climbing plant whose funnel-shaped blossoms close when the sunlight is strong.
- f. A flowering plant which flourishes in desert regions.
- g. One of the vegetables shown on the color plate opposite page 7470.
- h. A vegetable whose seeds must be started in a hot house or cold frame.
- i. A vegetable which was formerly called "love apple" and was considered poisonous.
- j. A plant sometimes called gumbo which is cultivated in many countries chiefly for its green pods.
- k. A popular garden composite which blooms late in the summer.
- l. A very common spring vegetable of which we eat the root.
- m. A well-known garden flower which can easily be raised from seed, but which does not, as a rule, bloom until the second year.
- n. A vegetable which has been developed from the cabbage plant.
- o. A plant whose beautiful flowers are unusual because the sepals, the petals, and the divisions of the upper part of the pistil are all petal-like.

Answers:

8. Seed Plants

Marigold	Wheat
Onion	Orchid

10. An Endless Chain of Garden Plants

a. Shasta daisy.	i. Tomato.
b. Yam.	j. Okra.
c. Marigold.	k. Aster.
d. Delphinium.	l. Radish.
e. Morning glory.	m. Hollyhock.
f. Yucca.	n. Kohl rabi.
g. Artichoke.	o. Iris.
h. Eggplant.	

UNIT ELEVEN

Our Food

Main Understandings

1. Our food is all made by plants although we secure some of it indirectly by using animals which live on plants.
2. We need food to build up the body, to provide it with energy, and to regulate its activities.
3. Different kinds of food are needed to meet the different needs of the body.
4. Pure food is needed to insure good health.
5. Food should be chosen with care.

The Things We Eat

Of course, you know that food is important, but did you know that more than one-fourth of all the grown people in America are kept busy growing and preparing food for us to eat? It must be grown, and packed, and shipped. It must be sold, and cooked, and carried to the table for over one hundred million people in the United States. The fisheries of Alaska, the orchards of California, the forests of the tropics, the irrigated deserts of New Mexico and Arizona, the warm states of the South, the cool states of the North, distant lands, and the islands of the sea are all producing food for our everyday use. Surely we ought to know a lot about food.

One might live forty days or more without eating, but he could not play, nor work, nor grow much after he stopped eating. It is pleasant, too, to eat, especially after we have been exercising rather strenuously. Those who know best are constantly trying to make mealtime the happiest and most pleasant hour of the day. The food is varied and attractive. Music and conversation are often employed to help us enjoy this part of the day.

Food is even more attractive when we think of it as stored sunshine. Perhaps you hadn't thought of it in that way before. The toast you probably had for breakfast this morning was made from wheat bread. Some grains of wheat had been planted in the earth. The warmth of the sunlight made them grow, and the tiny plants pushed up to the surface and spread their leaves out in the light. The sunlight shining on the leaves caused them to turn green because one of the most wonderful materials in the world is in them. This material is called *chlorophyll*, from two Greek words meaning *the green of leaves*. As the sun shone on the chlorophyll, it was able to make food from some common chemicals and the sunshine. This food made the wheat plant grow until the summer. Then a whole group of seeds or grain was formed. In each seed was a store of food which would help the next little plant grow until it could get up to the sunlight. The farmer cut the wheat, threshed out the grain, and, instead of planting it, sent it to the miller. The miller ground it into flour and sent it to the baker. The baker made it into bread and sent it to your home. Your mother toasted it for you. You ate it so that your body might have the energy of the sunshine to grow and work and play.

For dinner we may have some meat. Can that be made from plants, too? Let us see. The farmer grew corn and hay in his sunny fields. These he fed to cattle, which used the food to grow and build up their bodies. Then he sold these cattle to the meat packers. The packers sold the beef to your meat market,

and you again eat food to get the energy of sunshine which was captured and stored by plants.

Not only must our food be cared for and prepared so that it will be pleasant and nourishing, but it must be kept pure. There are all sorts of disease germs which might get into it, and all sorts of ways by which they can get in. There are many people who, if they are allowed to do so, will put harmful chemicals into food to make it look nice or to preserve it. To protect us from these dangers, national, state, and city governments have made many laws about the care and sale of food. Packing plants, restaurants, and dairies are carefully inspected. In the home we are very careful to preserve and care properly for our food.

When we are children, our parents choose and prepare our food for us. When we grow older, we often have the opportunity to choose what we shall eat and what we shall prepare for others to eat. Nothing is more important than to eat the right amount of the right things. THE WORLD BOOK can help you to learn more about the different kinds of food, why you need them, and how to choose your food properly. The outline and questions will guide you in finding out the most important things.

Study Outline

[Numbers refer to pages in THE WORLD BOOK Encyclopedia.]

I. Where Our Food Comes From.

A. Food-Making in Green Plants. See BIOCHEMISTRY (Photosynthesis, 743); BOTANY (Contributions to Human Welfare), 889; CHLOROPHYLL, 1406; PLANTS (Importance of), 5647-5648; STARCH, 6809.

1. What plant process is the basis of all plant and animal life?
2. Compare the process of food-making in green plants with the work of a factory.
3. Where do the plants get the energy which they store in food?
4. From what one type of food material are all others made?
5. How and where are the others made?
6. What is the source of minerals for plants?

B. Food for Non-Green Plants. See FUNGI, 2637; PARASITE (Plant), 5363-5365.

7. If you eat mushrooms is it correct to say that your food all came from green plants? Why?

C. Food for Animals. See ANIMAL, 289; BOTANY (Contributions to Human Welfare), 889; BIOCHEMISTRY (The Derivation of Energy), 742-743.

8. What is the most important difference between plants and animals?
9. Do animals make protein?
10. If you eat beef, is it correct to say that all your food came from green plants? Why?

D. The Business of Food Production. See AGRICULTURE, 93-104, and the lists of topics, outline, and questions accompanying that article.

II. Why the Body Needs Food. See ADULTERATION OF FOODSTUFFS AND CLOTHING (Foods), 54-56; BIOCHEMISTRY (The Derivation of Energy), 742-743; FOOD (Work of the Body), 2509; FOOD (as Fuel), 2511; METABOLISM, 4413-4414; NUTRITION (The Human Body Like a Steam Engine), 5121-5122.

11. What is a food?
12. Is water a food?
13. Give two different facts to illustrate each important need for food in the body.
14. How do scientists find out how much energy a person uses in a day?
15. How is the human body not like a locomotive in its use of fuel?
16. Under what conditions does the body need the most energy-producing food?
17. At what time of life does the body need the most growth-producing food?
18. How can you show that the body needs minerals?
19. What happens to food when more is eaten than the body needs?

III. Kinds of Food Substances Needed by the Body. See ADULTERATION OF FOODSTUFFS (Foods), 54-55; BIOCHEMISTRY (Substances in Animals and Plants), 742-743; FOOD (Chemistry of, Proteins, Fats, Inorganic Substances, Water, Refuse, Vitamins), 2509-2511; METABOLISM, 4413-4414.

A. Carbohydrates. See CARBOHYDRATES, 1190-1191; GLUCOSE, 2845; STARCH, 6809-6810; SUGAR, 6906-6910.

20. How many kinds of carbohydrates can you name?
21. Why are these food substances called carbohydrates?
22. Which carbohydrate commonly found in food is insoluble, but easily digested?
23. Which carbohydrate does not need digesting?
24. How can one test a food to find if it contains starch?

25. To what use are carbohydrates put in the body?
26. If too much carbohydrate is eaten, what does the body do with it?
27. List five common foods which are rich in carbohydrates.

B. Fats. See FAT, 2376-2378, and list of references at the end of that article.

28. Why is fat a wintertime food?
29. List three values of fat in the diet?
30. What becomes of the fat we eat which is not needed by the body?
31. List five common foods which are rich with fat.

C. Proteins. See PROTEINS, 5851.

32. How are proteins distinctly different from fats, and from carbohydrates?
33. Could one get along without eating any protein at all?
34. Name five foods which rank high in protein content.
35. What effect does the eating of too much protein have on the body?

D. Minerals. See FOOD (Inorganic Substances, 2511); NUTRITION (Milk a Unique Food, Mineral Substances in Food, 5124).

36. Through what foods do we obtain the largest amounts of minerals?

E. Vitamins. See VITAMINS, 7549-7550.

37. What is a vitamin?
38. Why are babies given cod liver oil?
39. Make a table in which you give the known vitamins, their especial value to the body, and two foods in which each one is rather abundant.

IV. Purity of Food. See ADULTERATION OF FOODSTUFFS AND CLOTHING (Food, 54-56); HEALTH HABITS (Food Habits), 3104-3105.

40. Make a list of the impurities which might be found in food.
41. Which kind of impurities are most dangerous?
42. How may germs be kept off food?
43. How may bacteria in food be killed?

V. Choosing Our Food. See CALORIE, 1100; FOOD (Quantity of), 2511-2512; HEALTH HABITS (Food Habits), 3104-3105; NUTRITION, 5122-5126.

44. Is it important for you yourself to know something about choosing food? Why?
45. What is a calorie?
46. How many calories a day should you eat?
47. How much water should you drink?
48. Are taste and appetite good guides for choosing food? Why?

49. Why should one choose a wide variety of food?
50. Which food material is apt to be eaten in too great a quantity?

Things to Do

1. Cover a plant with a light-tight box for several weeks to see how it will change.

2. Match the following parts of sentences to make correct statements:

- | | |
|-------------|---|
| a. Proteins | a. are fuel and energy foods. |
| b. Starches | b. produce more heat per ounce in the body than any other food. |
| c. Fats | c. turn blue when iodine is put on them. |
| d. Sugars | d. are the building and repair materials of the body. |

3. Find out where all the food you eat during one day came from.

4. Mix a few drops of tincture of iodine (from a drug store) with a tablespoonful or two of water in a small bottle. With a medicine dropper put a little of the mixture on as many different kinds of food as you can collect. Which have much starch? Which have none that you can see? (Starch turns blue when iodine is put on it. Nothing else will do that.)

5. If you can find a compound microscope to use, scrape a tiny bit of starch from a cut potato into a drop of water on a piece of glass. Put a piece of thin glass on top of it and examine the starch grains. Scrape some from the inside of a cooked bean. Are the grains like those of the potato? In the same way, examine starch from other foods.

6. Examine the edge of very thin slices of apple, potato, tomato, or the very thinnest skin of an onion under the microscope. What strange things do you see?

7. Cut a crisp celery stalk from the bunch, and place the cut end immediately in water colored with red or blue ink. Leave it for an hour or so. What has happened? Cut across the stalk a few inches from the bottom and examine the cut end.

8. Put a small piece of bread in an old iron spoon. Heat it over a flame until the bread has all burned away. What is left?

9. Make a list of foods which we use that were really stored in the plant for its own future use.

10. Make a list of foods that are fruits whose attractiveness aids in the scattering of plant seeds.

11. Make a list of foods which are the leafy parts of plants.

12. Play a spelling game with the names of foods. Each person must spell the name of a food which begins with the last letter of the one before; thus, p-o-t-a-t-o, o-k-r-a, a-p-p-l-e, etc.

13. Have a contest in food geography. Choose sides. The chooser of one side names a food, and the chooser of the other side must tell from what state or foreign country it comes. If he cannot, he must drop out. The next person on his side then names a food for the second one on the other side, etc. The side wins which has the most members standing at the end.

14. Make a special study of one of the following topics. Write a report for your teacher, telling her what you have learned.

a. Fruit as food. See FRUIT, 2629, and topics listed at the end of that article.

b. Nuts which are important as food. See NUT, 5119-5120, and list of topics at end of the article.

c. How we get our meat. See BEEF, 683-685; CATTLE, 1250-1258; MEAT AND MEAT PACKING, 4360-4368, and list of references.

15. Prepare a booklet on—

a. Wheat. See page 7736 for suggestions.

b. Sugar. See page 6910 for a suggestive outline.

Answers to section 2, above:

- | | |
|--------------|-----------|
| 2. a with d. | c with b. |
| b with c. | d with a. |

UNIT TWELVE

Our Weather

Main Understandings

1. Weather is the condition of the atmosphere.
2. The sunlight warms our atmosphere.
3. Warmth, or heat, causes water vapor to form and mix with the air; when sufficiently cooled, the vapor condenses into dew, frost, clouds, rain, or snow.
4. Air moves from one place to another because cool, dry air is heavier, or more dense, than warm, moist air.
5. Great areas of cloudy and clear weather move across the country in a general easterly direction; this makes it possible to forecast the weather quite accurately for several hours.

How Our Weather Is Made

Would there be any weather if we lived on the moon? Scientists who for many years have been looking for signs of wind, clouds,

and snow on the moon tell us that they haven't been able to find any indications of such signs. They tell us, too, that it is because the moon has no air around it that it can have no weather. Here on the earth we do have air, a great

ocean of it, which may be 200 miles deep. In this ocean of air, our weather is made.

Strange as it may seem to you, the sun causes all our weather changes. You can easily see how some of our days are bright and warm when the sun is high in the sky and there are no clouds to hide it. The warming rays shine out to us through the millions of miles of empty space. They pass right through the air without warming it very much. But they do warm the soil and stones and plants on the earth. When these are warm, their heat is given to the air and this warms it.

It is not easy to understand how the warmth of the sun can cause clouds and rain. Far away in the South, perhaps, the water of the sea was warmed by the sun. The heat made the water evaporate and mix with the air. Then a wind blew the air from the sea miles and miles across the earth toward where you live. In making this long trip, the water vapor rose higher and higher in the air, until it was up where the air is cold and cannot hold so much moisture as invisible gas. The only thing some of the vapor could do was to change back into water, billions of tiny droplets of it. These minute droplets form the clouds which float in the air and sometimes hide the sun from you. If the air had become still cooler, these droplets would have grown into larger drops and become too heavy to stay in the clouds, and then they would have fallen as rain. If there had been no heat from the sun, the water would not have evaporated and there would therefore have been no clouds and no rain.

The sun's heat makes the wind blow, too. The earth gets much warmer in some places than in others. The air over a warm place will expand and get lighter, or less dense, as it is warmed. The air over a cooler place will still be heavy, or dense. It will push toward the warm air harder than the warm air will push toward it. The warm air will have cooler air pushing in from all sides and will have to go straight up. If you should be standing between the warm spot and a cooler one, you will feel the cool air blowing past you as it pushes in toward the warm air. Winds are all caused in much the same way, but it is not always easy to find out where they come from or where they go.

If the sun is the cause of the weather, does the weather man look at the sun to tell when a cold wave or a rainy day is coming? That really wouldn't help much, for the sun changes very little from day to day. The weather man in America has helpers scattered all over our country and even nearby countries. At certain times every day, these helpers find out all about the weather where they are and send their reports to the weather man. When he gets all this information and studies it carefully,

he finds that large areas are covered by cloudy weather, where it is warm and toward which the wind is blowing from all directions. Other large areas have cool, clear weather, with the wind blowing outward in all directions. He knows that these great spots of cloudy and of clear weather move along certain paths. Thus he can predict that to-morrow will be a fine day for picnics, although it may be raining to-day. Or he can tell that a cold wave will arrive to-night, because it was on its way last night. By his knowledge, he is able to save many lives and millions of dollars' worth of property each year.

The references and questions will help you to learn from *THE WORLD BOOK* many more interesting things about weather and the work of the weather man.

Study Outline

[Numbers refer to pages in *THE WORLD BOOK Encyclopedia*. Articles starred (*) are to be read in full.]

I. What Weather Is, and How It Affects Us.

See *CLIMATE*, 1482; *WEATHER BUREAU*, 7686-7687

1. What is weather?
2. How is weather different from climate?
3. Why is it said that the weather is the biggest thing in the United States?

Review *AIR**, 108-111.

II. Heat, the Energy Which Causes Weather Changes.

A. *Its Source*. See *HEAT* (Where Heat Comes From), 3111; *SUN* (Composition and Heat of the Sun), 6922.

4. Of all the sources of heat named in the discussion of heat, which is most important in weather? Which others do you think have some effect?

5. How much heat does the earth receive from the sun in a year?

B. *Its Distribution*. See *AIR* (What the Air Does for Us), 111; *HEAT* (How Heat Travels), 3113-3114; *MOON* (Atmosphere), 4638-4639.

6. How does heat get to us from the sun?
7. How is heat carried about after it has reached the earth?
8. What would be the result if the earth did not rotate?
9. The atmosphere is sometimes said to act as a blanket about the earth. In what two ways does this blanket make us more comfortable?

C. *Its Measurement*. See *TEMPERATURE**, 7090-7091; *THERMOGRAPH**, 7144; *THERMOMETER**, 7144-7145.

10. What substances are commonly used in thermometer tubes?
11. Are Fahrenheit or Centigrade thermometers used in weather observations in the United States?
12. For what purpose would you use a thermograph?
13. Where is the coldest known place in the world? How cold does it get there?
14. What is the highest official record of temperature?

III. Moisture in the Atmosphere.

A. Evaporation. See CLOUD, 1492; EVAPORATION*, 2333; HEAT (What Heat Does), 3114; RAIN (What Is Rain?), 5984.

15. Where does the most of the water vapor in the air come from? Why?
16. How can ice and snow evaporate without melting?
17. Why are wet clothes usually cooler than dry ones?

B. Measuring Atmospheric Moisture. See HUMIDITY*, 3285-3286; HYGROMETER*, 3314-3315.

18. What do the following terms mean: *Humidity, low humidity, high humidity, humid, saturated, dew point, relative humidity*?
19. How can one tell without a hygrometer that the air is humid?
20. Why is the wet bulb of a hygrometer cooler than the dry one?
21. Will the difference between the wet bulb thermometer and the dry one be greater when the air is very humid or when it is very dry?

C. Condensation, or Precipitation of Moisture. See CLOUD*, 1491-1494; CLOUD-BURST*, 1494; DEW*, 1925-1926; DUST, ATMOSPHERIC, 2058; FOG*, 2505-2506; FROST*, 2628; HAIL*, 3005-3006; RAIN*, 5984-5986; RAINBOW*, 5986-5987; RAIN GAUGE*, 5987; SNOW*, 6664.

22. What change in air will cause water vapor to condense?
23. Make a list of the forms which condensed atmospheric moisture may take.
24. How does atmospheric dust help to form clouds?
25. Why are clouds constantly changing in form?
26. Make a list of the different kinds of clouds, and describe each one in a single sentence.
27. Is frost frozen dew? Why?
28. Where are fogs more commonly formed, and why?

29. Why does it hail but never snow when the weather is hot?
30. Why do not all clouds produce rain?
31. What would you think of a snow-storm if you had never seen one?
32. Is snow always white?
33. Of what advantage is it to have the tube of a rain gauge only one-tenth as large in area as the funnel which catches the rain?

IV. Wind, the Carrier of Heat and Moisture.

A. Air Pressure and Its Measurement. See AIR (Weight), 109; BAROMETER*, 625-627.

34. How many pounds of air are there above one square inch of the surface of the ocean?
35. Is there more or less air above a square inch of earth where you are than above the same area of the ocean? Why?
36. For what purposes are barometers chiefly used?
37. Why does the mercury stay up in the tube of a mercury barometer?
38. Why does the mercury not always stay at the same height in the tube of a barometer?
39. What advantages has a barograph over the ordinary mercury barometer?
40. What is an aneroid barometer?

B. How Heat Causes Wind. See HEAT (Convection), 3113; LAND AND SEA BREEZES*, 3851-3852; WIND, 7789-7791.

41. How does heat make air lighter, or less dense?
42. Will a barometer ordinarily stand higher in a warm area or in a cold one?
43. Do winds blow toward warm areas or away from them? Illustrate your answer by giving actual examples.
44. What is an anemometer?

C. The Importance of Wind. See BLIZZARD*, 794; CHINOOK*, 1402-1403; CLIMATE (Winds), 1483; MONSOON*, 4609; PREVAILING WESTERLIES*, 5809; RAIN, 5984-5986; SIMOON*, 6615; TORNADO*, 7214; TRADE WINDS*, 7235-7236; WHIRLWIND*, 7742; WIND (Effects of Wind), 7790.

45. Make a list of the effects of wind, giving, if possible, a real instance of each effect.

V. Cyclones and Weather Forecasting.

A. Cyclonic Storms, or Storm Areas. See CYCLONE (3), 1796; HURRICANE*, 3296; TYPHOON*, 7341.

46. How is a cyclone different from a tornado?
47. Is it usually cloudy or clear in a cyclone? Why?
48. What direction do the cyclones in our country move? Why?
49. What kind of weather prevails in an anticyclone?
50. How can a barometer indicate the approach of a cyclone or anticyclone?

B. Weather Forecasts. See METEOROLOGY*, 4418; WEATHER BUREAU*, 7686-7692.

51. How often are the weather conditions of the United States surveyed?
52. How many observing stations are there?
53. What does a weather map show?
54. If you were examining a weather map which had just been published and discovered a strong low pressure area or cyclone some hundreds of miles to the west of your city, what kind of weather would you predict for the next twelve hours?
55. How accurately can the "weather man" forecast the weather?
56. Do you believe that the elaborate organization of the United States Weather Bureau is justified?

Things to Do

1. Make a collection of weather signs and proverbs. Mark with a star the ones you think are at least partly scientific.

2. Find out how a rainbow is formed. (See RAINBOW, 5986-5987.) Why does no one ever reach the end of a rainbow?

3. Make a weather vane according to these directions: Cut the shaft and head of an arrow about 18 inches long out of a board one-half inch thick. Make the tail of the arrow of very thin wood, and tack it to the shaft. At the point where the arrow balances, bore a hole a little larger than a nail or burn it through with a red-hot nail. Drive a nail through this hole into the smooth top of an upright stick. If the nail fits loosely, the arrow should point in the direction from which the wind is coming.

4. Watch an icicle during a cold spell, to see if it evaporates without melting. You can make a convenient icicle outside a north window when the weather is cold. Arrange a

sloping board a foot long, so that you can set a can of cold water at the upper end of it. Have a very small hole in the side of the can near the bottom, so that the water can run slowly down the board and freeze at the lower end.

5. Test your knowledge of weather by matching these parts of correct sentences:

- | | |
|---|--|
| a. A falling barometer means that | a. from the sea to the land. |
| b. A fog is the same as | b. the air is cooled. |
| c. Late at night a breeze blows | c. a cloud near the ground. |
| d. Winds are useful because they carry moisture | d. the weather will probably soon be stormy. |
| e. Moisture often condenses when | e. from the land to the sea. |

6. Count the seconds between a flash of lightning and the thunder caused by it. How far away was the flash. See SOUND (Speed of Sound), 694-695.

7. Send to the nearest Weather Bureau office for its daily weather map. (The cost is 20 cents a month.) Trace the paths of "lows" and "highs" across the country. Try to forecast the weather from the map before you have read the weather man's forecast.

8. Do you know your weather instruments?

- | | | |
|-----------------|-------------|--------------------|
| a. Barometers | } measure { | a. humidity |
| b. Anemometers | | b. air pressure |
| c. Rain gauges | | c. temperature |
| d. Hygrometers | | d. wind velocity |
| e. Thermometers | | e. amount rainfall |

9. Read about one of the following topics and prepare a paper on it.

- a. Hurricanes, tornadoes, and cyclones. See CYCLONE, 1796; HURRICANE, 3296; TORNADO, 7214; WATERSPOUT, 7674; WHIRLWIND, 7742.
- b. Important winds of the earth. See the list of references under the topic, "The Importance of Winds," in the Study Outline for this unit.
- c. The causes of deserts. See CLIMATE (Mountains and Rainfall), 1483; DESERT, 1916; SAHARA (Climate), 6299.
- d. Cloud forms. See CLOUDS (Every Cloud Has a Name), 1492-1493.

Answers:

- | | |
|-------------|-------------|
| 5. a and d. | 7. a and b. |
| b and c. | b and d. |
| c and a. | c and e. |
| d and e. | d and a. |
| e and b. | e and c. |

UNIT THIRTEEN

The Water Supply of Modern Homes and Cities

Main Understandings

1. A source which supplies plenty of fairly pure water at low cost is desirable.
2. Water must sometimes be purified before being used in homes.
3. Facilities for securing and distributing water are necessary.
4. Many devices help control the water in the home.
5. To protect ourselves and others, the waste water must be carefully disposed of.

How Our Modern Water Supply Developed

You might live forty days or more without food, but within a few hours after you had taken a last drink of water you would be in great discomfort, and within three days you would probably be dead. Civilized man needs much water for washing himself and his clothing, as well as for drinking. Small wonder it is, then, that the first settlers built their cabins near springs or streams, or that, lacking these sources, each pioneer made great haste to dig a well or a cistern.

Such simple sources as springs and shallow wells served their purpose until the country became more thickly populated. Then the streams and the soil became impure from the wastes of homes and stables. Now deep wells are almost a necessity. They are quite satisfactory, too, for country and village homes.

So much water is needed in cities, and there is so much danger from impurities, that it becomes a great problem to get enough pure water to use. Even in Biblical times, great stone or brick and cement troughs were built, and tunnels were hewn through solid rock to bring water to cities from clean streams. The emperors of Rome built eleven great aqueducts, each several miles long, and some of them are still used for carrying water to that city. Small cities may get their water from very deep wells or from artesian wells, but such cities as New York, Chicago, and Saint Louis must take their supply from streams or lakes, in order to get enough at a reasonable cost. Sometimes the cities are far from suitable streams, and great aqueducts must be built to carry water from these streams to the cities, as in the case of Los Angeles or New York. There are a number of aqueducts over a hundred miles long which are used to bring water to American cities.

Rain water is the purest natural water known, for it is really distilled by nature. Just as soon as it condenses, however, it collects particles of dust and also dissolves gases from the air, and just as soon as it falls on the earth it becomes quite impure. It gets muddy with tiny pieces of the soil on which it falls. If there are disease germs about, they will be in the water, too. Mineral matter from the soil and rocks dissolve and go along with it. These

minerals make the water "hard," and also help to increase the saltiness of the ocean.

We may drink water from most wells without danger, especially if we know that they are in constant use. This water has been purified by filtering through the soil and rocks. Any other water in a well-settled country should be boiled before it is used. This makes sure that there are no live germs left in it.

Large cities couldn't very well boil all their water. Besides that, boiling wouldn't take the mud out of it, so they must commonly strain it through filters of sand and use chlorine gas to kill any germs which may get through the sand. Sand filters must let the water go through rapidly when they are used for such large cities, and so chemicals are used to help clean the water. When a small quantity of either aluminum sulphate or iron sulphate is dissolved in water, a strange thing happens. The water seems to get cloudy and more impure than it was at first. A great many jelly-like flakes form in the water and slowly settle to the bottom. Then it is seen that the water is much cleaner than before, for these sticky flakes take the dirt and bacteria with them as they settle. When the water goes to the filter, some of these flakes settle on top of the filter sand and help to strain the water.

The pioneer took his bucket to the spring and dipped up the water, or if he had a well, he tied the bucket to the end of a rope, and letting it down in the well, drew it up again full of water. Then he carried it into the house. In time, pumps became common, but the water still had to be carried inside. Many country homes now have windmills or gasoline engines to pump the water and pipes to carry it from place to place. Sometimes there is a tank in the attic or on a high tower, so that when it is filled the water will run down to the places where it is needed. The most modern way is for the farmer or suburban dweller to have a large air-tight tank in the basement. As the water is pumped into the tank, the air which was in the tank is compressed. This air pushes the water out again with great force when a faucet is opened.

Modern cities must have pressure to send the water to homes and factories and to put out fires. Reservoirs are constructed high in the mountains, into which the water of pure

streams runs. Gravity then carries the water from the reservoir down into the city. If there is no source from which the water can run down into a city, pumps must constantly force the water to the homes. In Chicago, a single great centrifugal pump can take 40,000,000 gallons of water a day from Lake Michigan and send it through the pipes at a pressure of 40 pounds per square inch. This would furnish 250 gallons of water for 160,000 people. Yet this great city must have thirty or more such pumps to keep everybody supplied with water.

In other days, if you had had water piped into your home, the pressure might not have been very high, and you might have used a wooden plug or a wooden spigot to stop up the end of the pipe when you wanted no more water. To-day the pressure is so high that we must have a metal faucet with a screw or lever which forces the stopper into the opening. We even have some which automatically stop up the pipe when we let loose of them or when the vessel is full. There is needed, besides faucets on the ends of the pipes, valves in the pipes, so that if there are repairs to be made the water in the entire system can be shut off.

We are not any better satisfied with cold water only than we are to get along with wooden faucets. We must, therefore, have a separate set of hot-water pipes and a heater to heat the water that goes through them. The result is that when a modern house is built, a great deal of plumbing and many devices for using water go into it.

To-day, too, we must be careful not to throw all the waste water and sewage out on the ground or into streams where it will spoil our own drinking water or that of other people. For this waste, a third set of pipes is installed in the modern home and throughout each city. The outflow of such a set of pipes, whether from a city or from a home, should be into a septic tank or sewage disposal plant where bacteria are allowed to destroy the harmful wastes.

THE WORLD BOOK will tell you more about the interesting phases of our water supply. Follow the guide outline and references, and see if you can answer all the questions.

Study Outline

[Numbers refer to pages in THE WORLD BOOK Encyclopedia. Articles starred (*) are to be read in full.]

I. Sources of Water for Home Use.

A. Requirements for Desirable Sources.

See WATER (Sources and Kinds of Water), 7664; WATERWORKS, 7676.

1. What is the most important characteristic of a good water supply?
2. What other matters do you think should be considered in choosing a source of water either for a home or for a city?

B. Kinds of Sources. See AQUEDUCT, 335-338; ARTESIAN WELL*, 424; CHICAGO (How the City Gets Its Water), 1360-1362; GEOLOGY (Work of the Hydrosphere—*Water Table*), 2733; MINERAL WATERS*, 4500; SPRING*, 6778-6779; WATER (Sources and Kinds of Water), 7664; WATERWORKS, 7676; WELL BORING*, 7705.

3. Make a list of all the different sources you know from which water may be taken for home use.
4. Of the sources you have listed, which are ordinarily suitable for a single home and which are suitable for a large city?
5. What is a water table? What connection has a well with a water table?
6. Where is the deepest well in the world and how deep is it?
7. How are artesian wells different from ordinary wells?
8. Where in the United States is the largest number of artesian wells?
9. Where does the water of a spring come from?
10. Where is the largest limestone spring in America?
11. Why may we say that the ocean is the source of all our water?
12. Kansas City, Cincinnati, and Saint Louis take their supply of water from large rivers. Think of two good reasons for this plan.
13. Why has New York gone to so much trouble and expense to secure water from mountain streams many miles away when the Hudson River flows right through the city?

II. The Purification of the Water Supply.

A. Sources and Kinds of Impurities. See RESERVOIR, 6065; SOLUTION*, 6685; TYPHOID FEVER*, 7340-7341; WATER (Sources and Kinds of Water), 7664; WATERWORKS, 7676.

14. List the different kinds of impurities which may be found in water.
15. Which kinds are really harmful?
16. Which kinds make water unpleasant to use?
17. What is the difference between dissolved impurities and suspended impurities? Which is more easily removed?
18. What is "hard" water? Where does it get its hardness?
19. Is there such a thing as absolutely pure water?

20. How do disease germs, such as those of typhoid fever, get into a water supply?

B. Filtration. See FILTER*, 2419.

21. What kinds of material are commonly used for filters?
 22. What kinds of impurities do filters remove from the water?
 23. Why may well water be considered filtered water?
 24. Is it always safe to drink filtered water?
 25. How large may a city filtration plant be?

C. Boiling.

26. When should drinking water be boiled?
 27. Why does boiled water have a flat taste?

D. Chemical Treatment. See CHLORINE, 1406; WATERWORKS, 7676.

28. What dangerous kind of impurity does chlorine get rid of?

E. Distillation. See DISTILLATION*, 1967; WATER (Sources and Kinds of Water), 7664.

29. What two processes are included in distillation?
 30. Why does distillation purify water?
 31. Why may rain water be considered distilled water?
 32. What common uses of artificially distilled water do you know?

III. Storage, Transportation, and Distribution of the Water Supply.

A. Reservoirs. See DAM, 1814; RESERVOIR, 6065.

33. List the different kinds of reservoirs.
 34. What difficulty has been experienced with standpipes? How would you overcome it?

B. Aqueducts and Water Mains. See AQUEDUCT*, 335-338; SIPHON*, 6625; WATERWORKS*, 7676-7680.

35. Make a table in which you give the important modern aqueducts and such important facts about them as length, diameter, capacity, material, and date constructed.
 36. Why were ancient aqueducts carried across bridges instead of going down into the valleys and up the other side as they do to-day?
 37. How many miles of water mains may a large city need?

C. Pressure for Distribution. See AQUEDUCT, 335-338; HYDRAULIC RAM*, 3304-3305; PUMP, 5880-5881; RESERVOIR, 6065; WATERWORKS, 7676.

38. Why will not a lift pump work without air pressure?
 39. What did Galileo notice about pumps?
 40. Would you use force pumps, centrifugal pumps, or lift pumps for a city water supply? For a farm water supply?
 41. Name two cities which use gravity to provide their water pressure.
 42. Why do cities which get their water by gravity sometimes need a pumping system, too?

IV. Disposal of Waste Water. See CHICAGO (How the City Gets Its Water), 1360-1362; SEWAGE AND SEWERAGE, 6511-6514.

43. Do sewers ordinarily carry rain water from the streets of a city? Why or why not?
 44. What is the commonest way of disposing of sewage?
 45. Why is this method often objectionable?
 46. How are sewer gases kept from coming up through sinks and wash bowls?
 47. Where is the largest activated sludge sewage disposal plant in the world?
 48. How should a farm or suburban home dispose of its sewage? Do bacteria help in this, too?

Things to Do

1. Does your drinking water contain any impurities? Pour a quart of it into a pan (a dark-colored enamel one is best), and heat it until it has all evaporated. Any impurities of the water will be left on the bottom of the pan. Catch a quart of rain water and evaporate it to find if there is any difference. Are these impurities harmful?

2. Visit the waterworks of your city to find how they purify and pump your water. The engineers of most city pumping stations are glad to tell visitors about their work.

3. Plan a water-supply and plumbing system for a country house or farm house.

4. Find out how a hydraulic ram pumps water. See HYDRAULIC RAM, 3304-3305.

5. Make a filter, and see if you can make muddy water clear. You may follow these directions: Take a tall lamp chimney or a tall bottle with the bottom broken out of it. Tie a fine piece of cloth over the top, turn it upside down, and fill it with fine washed sand. Support your filter in some way, and pour the muddy water in the top. Catch it as it comes out the bottom, and see if it is clear. Sometimes the first water that comes through will be rather muddy, and then after the filter has

been used a little while the water will come out quite clear.

6. Which of the pumps shown in the diagrams would pump water successfully and which would not?

7. Using sand and clay, make a model of a hill and valley so that there will be a spring on the hillside when you pour water on the hill.

8. Devise a way of distilling water, and make enough distilled water to taste.

9. If air pressure will not force water up a pipe more than fifty feet when the pump at

11. Prepare a report on one of the following topics:

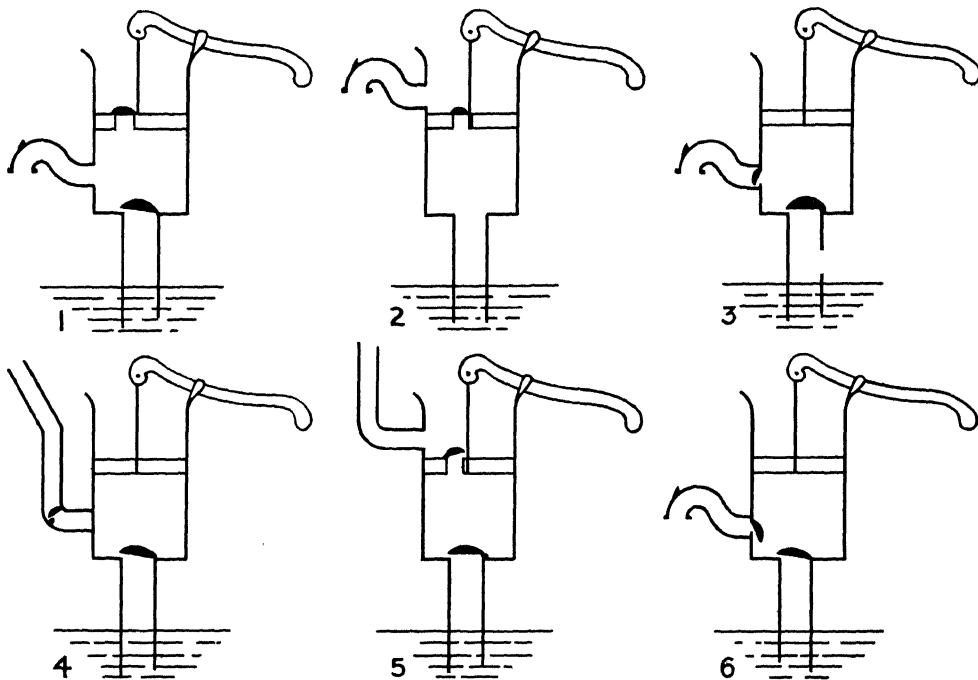
a. The differences between ancient and modern aqueducts. See **AQUEDUCTS**, 335-338.

b. The purification of water. See topics under "The Purification of the water Supply" in the Study Outline.

c. How water is put under pressure to force it through the pipes of cities and homes.

12. Put the following topics in their correct order:

a. Controlling water in the home.



DIAGRAMS OF THE PUMPS

the top is working, how can the water be pumped from a well 100 feet deep?

10. Take an old faucet apart, and learn how to repair others like it when they get leaky.

b. Forcing water through the pipes.

c. Disposing of waste water.

d. Taking water from a suitable source.

e. Purifying water.

UNIT FOURTEEN.

The Nature and Control of Fire

Main Understandings

1. To produce fire a combustible material must be raised to its kindling temperature in the presence of oxygen.
2. Fire is a chemical process in which some substances are used up and new ones are produced.
3. Fire is regulated through the supply of fuel or oxygen and extinguished by the removal of any one of the three essentials.
4. Fire has made civilization possible.

Servant or Master?

Among the myths of the ancient Greeks, there is one which tells how man came to

possess fire. In the beginning, fire belonged only to the gods. Prometheus, one of the gods, was an especial friend of man. He wanted to make man superior to the animals,

which then had many gifts greater than man himself possessed. Prometheus, therefore, stole a bit of fire from the chariot of the sun, and gave it to man. Zeus, the king of heaven, was very angry when he discovered that man had come into possession of what had previously belonged only to the gods, so Prometheus was chained to a mountain, where a vulture fed on his liver every day. Man, with the help of fire, was able to advance far beyond the animals.

The early Romans made the keeping of fire a religious rite. They had a temple presided over by Vesta, the goddess of the hearth. In this temple young girls, called vestal virgins, kept a fire burning night and day.

Such stories and customs show how high a value people placed on fire in ancient days, but important as it was to them, it is even more so to us. Not only does it cook our food, keep us warm, and light our homes in a better way than it did theirs, but it does three-fourths of the mechanical work of the world. It releases the energy stored in fuels by the sun, and we have heat to make iron and steel. It furnishes power to drive our automobiles, trains, and ships, and to turn the wheels of our factories.

So easily do we call fire to our service to-day that we do not realize how serious a matter was its production in early times. Fuel could be had in abundance, and the air provided plenty of oxygen for the fire, but to get these materials hot enough to start burning was difficult. An early settler would ride miles through snow drifts to borrow fire from a neighbor after his own had gone out in the night. Others were fortunate enough to have flint and steel, which when struck together threw sparks into finely shredded grass or other tinder and caused it to catch fire. A single penny will now buy sixty matches, each of which will strike fire in an instant.

Fire is very mysterious, too. Light a candle with one of those wonderful matches. Set it on a table, and watch it carefully. Fresh air moves in, giving it a constant supply of oxygen. The beautiful flame grows brighter, and gives a steady light. Above it you warm your hands. The wax slowly melts away. Some may run down and harden again but, if you wait, you can see that the candle is slowly disappearing. Before your eyes a chemical process is taking place. The wax of the candle and the oxygen of the air are together forming new gases, carbon dioxide and water vapor, which go away in the air. When this happens, heat and light are given off, and we say there is a fire.

Helpful and interesting as is this process, it becomes a devouring demon when once it is out of control. In the United States property worth over three hundred millions of dollars is destroyed by fire every year. The most important way for you to help curb this great

waste, and possibly prevent the destruction of your own home, is never to give fire a chance to get out of control. If it does get started, you should be prepared to deal with it immediately and sensibly. As quickly as possible, do one of three things: shut off the fire's supply of air, cool it down until it goes out, or remove its fuel supply. A blanket, rug, sand, or fire extinguisher acts in the first way, and a bucket of water will, in most cases, cool a small amount of burning material until the flame is extinguished. The third method is more commonly used in the case of great oil-well or forest fires which have gotten far out of control, but you should be ready to use it if the situation so demands. Quick action will often stop the fire before it has made much headway. If it gets beyond your control, get help.

The following Study Outline refers you to many articles in *THE WORLD BOOK* which tell about fire and its work.

Study Outline

[Numbers refer to pages in *THE WORLD BOOK Encyclopedia*. Articles starred (*) are to be read in full.]

I. The Essentials of Fire.

A. Combustible Material. See CANDLE AND CANDLE POWER, 1166; CARBON, 1192; CHARCOAL*, 1308-1309; COAL*, 1497-1507; COKE*, 1532; DISTILLATION (Fractional, Destructive), 1967-1968; EXPLOSIVES, 2345-2347; FUEL*, 2631; GAS, 2698-2700; GASOLINE*, 2703; GUNCOTTON, 2986-2987; GUNPOWDER, 2987-2988; NATURAL GAS*, 4819-4820; PEAT*, 5436; PETROLEUM, 5520-5529; TREE, 7258-7261.

1. How long ago was coal known? 2631
2. Why do you think coal is considered the standard fuel?
3. Why has there been a great change in the fuels used in America?
4. What fuels may help supply the future needs of the country?
5. What advantages have oils as fuel?
6. What was the first use of petroleum in America? 5520
7. How long has petroleum been known? 5520-5521
8. How long has petroleum been a commercial product? 5521
9. Why is kerosene sometimes called "coal oil"?
10. How is petroleum now treated to obtain valuable fuels? 1967-1968, 5526
11. Why is gasoline a very important fuel? 2703
12. How did it happen that the word gas originally meant *ghost* or *spirit*? 2698

13. Make as long a list as you can of the gases which are fuels. 2699-2700
14. What did the Indians do with natural gas? 4819
15. What are the uses of charcoal as a fuel, and why? 1309, 2631
16. Why has coke replaced charcoal in smelting iron ores? 1309, 1532, 2631
17. What chemical element is very important in most all fuels? 1192
18. What branch of chemistry deals with compounds of this element? Why is it so named? 1192
19. What is the chemical name for the compounds contained in petroleum? 1192
20. Where are all our fuels really manufactured? 889
21. How are explosives different from fuels? 2345-2347
22. Who first told how to make gunpowder? When? 2987
23. What is guncotton? 2986
- B. Oxygen.** See OXYGEN, 5281-5282.
 24. How did oxygen get its name? Can you tell why it was wrongly named?
 25. What fraction of the air is oxygen? What fraction of rock is oxygen?
 26. How does a match burn in pure oxygen?
 27. Why do you suppose iron burns in pure oxygen but not in the air?
 28. How is oxygen prepared for commercial uses?
 29. What are its uses?
- C. Heat for Ignition.** See ARCHIMEDES, 358; COMBUSTION (Spontaneous), 1580; DUST EXPLOSIONS, 2060; FIRE, 2426; FLINT, 2470; FUSE, 2654; GAS ENGINE (How Ignition or Explosion Is Produced), 2702; GREEK FIRE, 2952; HEAT (Where Heat Comes From), 3111-3112; LENS, 3934; LIGHTNING, 4001-4004; MATCHES, 4339; MUSKET, 4777-4778.
 30. How did Archimedes set fire to the Roman ships which attacked Syracuse? 358
 31. Why is a lens sometimes called a burning glass? 3934
 32. What causes spontaneous combustion? 1580
 33. How was a musket fired? 2470, 4777-4778
 34. What devices use the musket method of ignition to-day?
 35. Give three different types of ignition by electricity. 2654, 2702, 4001-4002

36. In what way is the whirling stick of the savage like the modern match? 2426, 4339
37. How did an instantaneous light box start a fire? 4339
38. Why will a safety match strike fire only on the box? 4339-4343

II. The Nature of Fire.

A. Oxidation, a Chemical Change. See CHEMISTRY (Chemical Compounds), 1335; COMBUSTION, 1580; FIRE, 2426; OXIDATION, 5281.

39. What becomes of wood when it burns? 1193, 2426, 5281
40. What name is given to the products of oxidation? 5281
41. What sort of material is the oxide of carbon? 1193
42. How is fire different from slow oxidation? 2426, 5281

B. Flame. See FLAME, 2462.

43. What kind of material is burning when there is a flame?
44. What gives a candle flame its yellow color?
45. How can the temperature of a flame be increased?
46. Why does a flame sometimes smoke?

C. Types of Fire. See CHARCOAL (Uses), 1309; COKE, 1532; COMBUSTION, 1580; DUST EXPLOSIONS, 2060; EXPLOSIVES, 2345-2347; FLAME, 2462; HYDROGEN, 3307.

47. What different types of fire can you find by reading the references given above?

III. The Products of Fire. See ASH, 439-440; CARBONIC-ACID GAS, 1193; CARBON MONOXIDE, 1194; CHARCOAL; FIRE, 2426; FLAME, 2462; HEAT (Where Heat Comes From [5]), 3112; LAMPBLACK*, 3848; OXIDATION, 5281; SMOKE, 6654; SOOT, 6689.

48. What are ashes? 439-440
49. When is carbon monoxide formed? 1194
50. What are the sources of danger of poisoning by carbon monoxide? 1194
51. Is charcoal a product of true burning? 1308
52. What uses has carbon dioxide? 1193
53. Is carbon dioxide poisonous? Why? 1193
54. What name do miners give to carbon dioxide? Why is it dangerous? 1193
55. What is the principal use of the flame of a candle or lamp?

56. How is lampblack made? 3848
57. What pigment is made from soot? 6689
58. Which product of fire do you consider to have the highest value?

IV. Control of Fire. See BUNSEN BURNER AND BATTERY, 1021-1022; FIRE, 2426-2428; FIRE DEPARTMENT*, 2429-2433; FIREPROOFING*, 2434; FORESTS AND FORESTRY, 2534-2541; FURNACE, 2646; STOVE, 6870-6871.

59. How does one regulate the rate of burning in a stove or furnace?
60. How is the rate of burning regulated in an oil lamp? Does this regulate air or fuel?
61. How is the temperature of a gas flame increased in the case of a bunsen burner?
62. Which of the essentials are regulated to control the burning in an automobile motor?
63. How long a street of buildings is burned in the United States each year? 2426-2428
64. List ten measures of fire prevention. 2428.
65. List five ways of smothering fires.
66. How does water put out an ordinary fire?
67. What is the danger of using water on an oil or gasoline fire?
68. How long have special fire pumps been known? 2432
69. How fast do modern engines pump water? 2432
70. How do firemen fight skyscraper fires? Why? 2432
71. What is the advantage of chemical extinguishers? 2432

V. The Value and Uses of Fire. See BOILER, 814-815; BRICK AND BRICK-MAKING, 945-946; CAMP (Camp Fires), 1110-1111; CEMENT, 1270-1282; CIVILIZATION, 1444-1449; FIREARMS, 2429; FIREBALL, 2429; FIREWORKS, 2435; FIRE WORSHIP, 2435-2436; IRON AGE, 3534; IRON AND STEEL, 3534-3551; GLASS, 2832-2841; HEATING AND VENTILATION, 3115-3118; LAMP, 3848; LOCOMOTIVE (Structure), 4078; STEAM ENGINE, 6819; AUTOMOBILE (Engine), 540; GAS ENGINE, 2701-2702.

72. Tell why each of these references was given to illustrate the value or use of fire.

Things to Do

1. Study a candle flame to see if you can observe the things described in the article FLAME, 2462.
2. Hold a match stick through the middle of a candle flame until it is ready to start burning. Remove it, and see if you can determine which part of the flame was hottest.
3. See how long you can hold a match head in the center of a bunsen burner flame without its burning.
4. See if you can lead unburned paraffin vapor out of the center of a candle flame. Hold a $\frac{1}{4}$ -inch glass tube, which has been heated, in a sloping position with one end in the center of the flame. If you are successful, you should be able to light the gas at the upper end of the tube.
5. Learn to make a fire with a whirling stick. See a Boy Scout Manual.
6. Get pieces of flint and steel. See if you can make sparks with them.
7. Use a burning glass to start a fire. A large reading glass will do nicely. Focus the rays of the sun on a piece of very dry rotten wood or punk. From the glow started in this, start larger and larger bits of material.
8. Learn how to make successful campfires. See CAMP (Campfires), 1110-1111.
9. Allow a candle to burn for some time so that the flame gets as large as possible. Blow the fire out quickly. Immediately bring a lighted match slowly down toward the smoking wick. Watch closely to see what happens. Why does it do this?
10. Study a spark-ignited cigarette lighter or gas lighter to see how the sparks are produced.
11. Learn how the different kinds of fire extinguishers work.
12. Prepare an oral or written report on one of these topics:
 - a. Fire and Civilization.
 - b. The Burning of a Candle.
 - c. Fuels.
 - d. By-products of Coal. (See COAL, 1497-1507.)
 - e. Gaseous Fuels.
 - f. Petroleum and Its Products.
 - g. The Products of Fire.
 - h. Explosives at Work.
 - i. Fire Prevention in the Home.

UNIT FIFTEEN

Heating and Ventilating Our Buildings

Main Understandings

1. The most of the heat which keeps our buildings comfortable in winter is produced by fire.
2. Heat travels away from fire and other places of high temperature by three methods: Conduction, convection, and radiation.

3. Heating devices use the three methods of heat transfer to carry heat from the fire to the air of our rooms.
4. In addition to being warm, the air should have the correct amount of humidity, and should be in motion.

How We Make a Summer Climate in Winter Homes

Before the discovery of fire, savage man had either to stay where it was warm all the time or find caves which did not get cold. He had to find a place to live where the natural climate was suitable. But as soon as he had learned how to start a fire and keep it going, he could make the climate warmer inside his crude shelters, and so make it possible, if not comfortable, to live in places where the natural climate was unfavorable. With a fire near him, the savage man was so much more comfortable that he did not mind some smoke in his eyes nor some cold air on his back. Of course, he did not need to worry about ventilation, for there were plenty of crevices and openings through which fresh air could come.

As time passed, man learned how to build better and better houses and how to make himself more comfortable in other ways. He was careful to build a special place in the wall for his fire, and have a chimney through which the smoke could escape. The heat from a great log fire in such a fireplace would make a room quite comfortable, but sometimes the smoke would blow out in the room. He also had to have a great store of wood to keep the fire going all winter.

About the time America was discovered, men sought better ways of heating their rooms. They knew how to use iron, and they made rather crude iron boxes, sometimes with only three sides, and in these they built their fires. Benjamin Franklin made one of the first of these crude stoves ever used in America. Such simple stoves took less fuel, and they heated the rooms better than fireplaces could do it, because less heat went up the chimney. They were gradually made better and better. One improvement was to move them out in the room, and use a pipe to carry the smoke to the chimney. Later, a jacket of sheet iron was put around them so that the cool air would enter the jacket at the bottom, be warmed and then pushed out at the top by more cool air coming in. In this way most of the air in the room was circulated through the jacket and warmed. The best stoves in use to-day are of this type.

People wanted their houses more and more comfortable, and also beautiful. In order to warm the whole house, several stoves were needed, and each had to have fuel carried to it. Each separate stove took up space, and needed to be kept clean. The next step, then, was to put a very large stove in the basement and have a pipe to carry warm air up to each room. Such pipes have to be quite large, and

so they take up much space. Any strong wind blows the warm air all to one side of the house and leaves the other side cold, so this plan is not entirely satisfactory. In spite of its drawbacks, it is widely used in private homes because of the low cost of installing it. It is also used in many school buildings because it provides a convenient method of ventilation.

Men who could afford to do so, tried making their furnaces water-tight and arranged two pipes leading from the jacket to an iron "radiator" in each room. Then, when the whole system was filled with water, and the fire was started, the water in the jacket got warm. The cold water in the radiators was then more dense than that in the jacket, and it flowed down through the lower pipes, at the same time pushing the warm water up into the radiators. The heat from the warm or hot water in the radiators warmed the rooms. Such a plan proves quite satisfactory for a small building in moderate climates, but the rooms cannot be heated very rapidly, and the water does not circulate well if the pipes are too long.

Where hot-water systems do not work well, steam may be used. In this system the heater or boiler is only partly filled with water. When the water boils, steam fills the upper part of the boiler and creates quite a high pressure. This pressure enables it to push the air out of the pipes and radiators through special air vents in the radiators. When the hot steam finally reaches the valves they close because of the heat, and consequently the steam is kept in the radiators to heat the rooms. A great deal of heat had to be put into the water just to change it to steam, and so, when the steam changes back into water in the radiators, all this heat is given to the radiator to heat the room. Thus, steam radiators heat quickly, and, because the pressure makes the steam travel through the pipes very rapidly, the radiators may be a mile away from the boiler, if necessary. For these reasons steam heat is used in most large buildings in America.

The problem of heating is to get the heat from a fire into the air of a room as quickly and economically as possible, and keep it there. Heat travels in three different ways. You have probably read about conduction already. (See Unit Five.) Sometimes the material which is hot is pushed away from the place where it got its heat and carries the heat to a cooler place. This method of heat transfer is called *convection*. The third method is *radiation*, which occurs when the heat "shines" out in straight lines through space. Radiation does not heat anything between the source and the object receiving the heat. For this reason, the heat of the sun may shine through air which

is far below zero, through a cold windowpane, and finally warm the floor of a room without having warmed either the air or the windowpane. Every heating system must use one or more of these ways to carry the heat where it is wanted.

The open fire and the fireplace heat by radiation chiefly, and so the air of a room which has only a fireplace becomes warm very slowly. The convection current from the fire carries much of the heat up the chimney. In the case of the stove, the heat is conducted through the wall of the stove. The hot wall of the stove heats the air by conduction, causing it to move away to other parts of the room in convection currents, and it also radiates heat to the walls and objects in the room. All the more complicated systems put in additional steps, the principal one of which is the carrying of heat from the furnace to the room by convection currents in air, water, or steam. Each different system has the essential parts for carrying the heat to the room, and also a number of auxiliary parts which help to regulate the fire and increase the heating efficiency of the plant.

Since fuel has become so costly, it pays owners of buildings to go to a great deal of expense to keep the heat in a room once it is there. Most modern buildings are, therefore, carefully insulated. That is, the walls and roof have material in them that are poor conductors of heat. The windows are also often made double and air-tight, to keep the heat inside. Such construction not only keeps the heat in when it is cold, but aids in keeping the heat out in summer.

When cold air is heated, its ability to absorb water vapor is increased a great deal. Therefore, the air in a room which is artificially heated absorbs moisture very rapidly from the skin and linings of the nose and bronchial tubes. The rapid evaporation cools us so fast that we want the room warmer than it should be. The nose and breathing spaces become dry, and seem to be more easily attacked by germs. To overcome this condition, moisture should be added to the air in some way, until it has at least 50 per cent of all it can hold. On the ordinary cold winter day, the warm air from a furnace or radiator has not more than 15 per cent of all it can hold. Our artificial climate is much more healthful when the humidity is thus increased.

Perfectly still air does not provide the greatest comfort. The air in a room should always be moving slowly, in such a way as to carry away from the body some moisture and heat, and any odors and dust which may be present.

There are many variations of heating systems and many ways of providing moisture and of circulating the air of buildings. THE

WORLD BOOK, with the Study Outline which follows, will give you a start toward learning about the different ways of heating buildings, and the devices which are used. Then you will be prepared to learn from the heating systems themselves, and will be better able to help solve the heating and ventilating problems of your own home.

Study Outline

[Numbers refer to pages in THE WORLD BOOK Encyclopedia. Articles starred (*) are to be read in full.]

I. Heat for Our Buildings.

A. Amount Needed. See HEATING AND VENTILATION, 3115-3116; LIFE EXTENSION (Rule 1), 3982.

1. What is the object of heating?
2. How important is a thermometer in a room? 3982
3. Why isn't it necessary for a room to be kept at body temperature?
4. What room temperatures are common in America?
5. How warm do North Europeans have their buildings?
6. What temperatures are best for health? 3982
7. What becomes of the heat in a warm room when we cease to add more?
8. By what paths does the heat escape?
9. How can this heat loss be reduced? 3116, 3469

B. Possible Sources. See ELECTRIC HEATING, 2171; HEAT (Where Heat Comes From), 3111-3113; HEATING AND VENTILATION (Heating the Home by Electricity), 3117-3118.

10. Which of the six sources of heat listed in the article are helpful in heating our buildings? Which is most important?

C. Fuels. See COAL, 1497-1507; COKE, 1532; FUEL*, 2631; GAS (Illuminating), 2699-2706; HEATING AND VENTILATION (Oil Heating, Heating by Gas), 3116-3117, 3118; PEAT, 5436-5437; PETROLEUM, 5520-5529; STOVE, 6870-6871.

11. How long has coal been known? 2631
12. How much more effective than a pound of wood is a pound of coal?
13. Give five advantages of oil for fuel.
14. What is the best fuel for home heating?
15. Under what circumstances is wood used for fuel?
16. What fuel resources of the United States are not being used to any great extent?

17. Why may we say that the real source of heat for our homes is the sun? 1497

II. How Heat Travels.

A. Conduction. See Study Outline and Questions on CONDUCTION OF HEAT, Unit Five.

B. Convection. See Study Outline and Questions on the Weather (Air Pressure and Winds), in this General Science section; EXPANSION, 2344; HEAT (How Heat Travels), 3113; WIND, 7789.

18. Why does heat cause substances to expand? 2344
19. How does expansion make substances become less dense? 3113
20. What is a convection current?
21. Explain why we say convection carries heat from one place to another.
22. Does warm air rise of its own accord, or is it pushed up by the more dense cool air around it? 7789
23. Make a list of ten common examples of the transfer of heat by convection.
- C. Radiation. See HEAT (How Heat Travels), 3113-3114.
24. How is radiation different from conduction and convection?
25. If a stove is still radiating heat when it becomes cooler than your body, why do you not feel the radiated heat?
26. Is "indirect radiation" in heating really radiation or not? Why? 3116
27. Make a list of ten common examples of the transfer of heat by radiation.

III. How Heating Devices Work.

A. The Stove. See STOVE*, 6870-6871.

28. What are the essential features of a stove?
29. What materials have been used to make stoves?
30. What fuel do you consider best for heating stoves?
31. Copy the diagram of a stove given below. Show, by the use of differently colored pencils, where radiation helps to transfer heat from the fire to the room, where convection helps, and where conduction helps. You might use straight lines for radiation, arrows for convection, and dots for conduction.

B. The Warm-Air Furnace. See FURNACE, 2646; HEATING AND VENTILATION (Warm-Air Heating), 3116.

32. How does a warm-air furnace differ in principle from a stove?

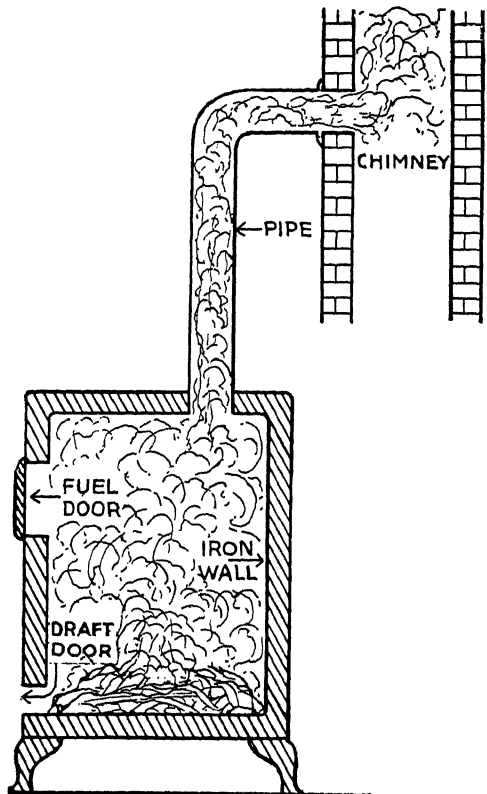


DIAGRAM OF A STOVE

The walls are shown much thicker than they really are.

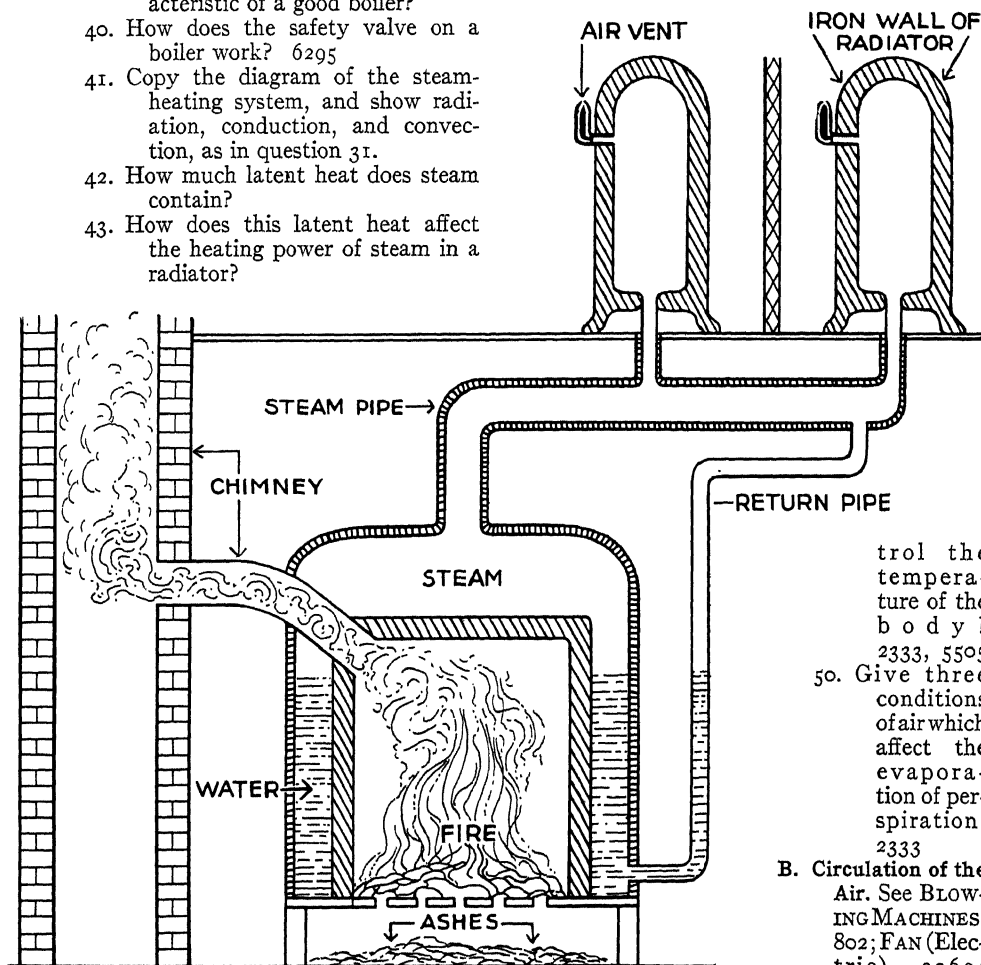
33. What advantages can you discover for the use of a furnace?
34. What is the most serious disadvantage of warm-air heating? 3116 (Hot-Water and Steam Heating?)

C. Hot-Water and Steam Systems. See BOILER, 814-815; GAUGE*, 2705; HEATING AND VENTILATION (Hot Water and Steam Heating), 3116; STEAM, 6817-6819; SAFETY VALVE*, 6295-6296; VALVE (Illustration), 7448.

35. Give four reasons why these systems are better than warm-air systems.
36. Give three advantages of hot-water heating over steam.
37. Give three advantages of steam systems over hot-water systems.

See story preceding this outline, and 3116.

38. What is the use of the steam dome in a boiler? 814
39. What is the most important characteristic of a good boiler?
40. How does the safety valve on a boiler work? 6295
41. Copy the diagram of the steam-heating system, and show radiation, conduction, and convection, as in question 31.
42. How much latent heat does steam contain?
43. How does this latent heat affect the heating power of steam in a radiator?



SIMPLE DIAGRAM OF A ONE-PIPE STEAM-HEATING SYSTEM

44. How much space does steam occupy as compared with an equal weight of water?
45. How does this change of volume aid in the operation of the heating plant?
46. Why does the hot water go to the radiator of a hot-water system? (See diagram and 3113.)
47. Why do you think an expansion tank is necessary in a hot-water system?

IV. Keeping Warm Air Agreeable and Healthful.

A. The Requirements. See EVAPORATION, 2333; HEATING AND VENTILATION

(Recirculated Air), 3119-3120; PERSPIRATION, 5505.

48. Give reasons for each of the chief needs in ventilation.
49. How can perspiration help to con-

trol the temperature of the body?

- 2333, 5505
50. Give three conditions of air which affect the evaporation of perspiration.

2333

B. Circulation of the Air. See BLOWING MACHINES, 802; FAN (Electric), 2369; HEATING AND VENTILATION

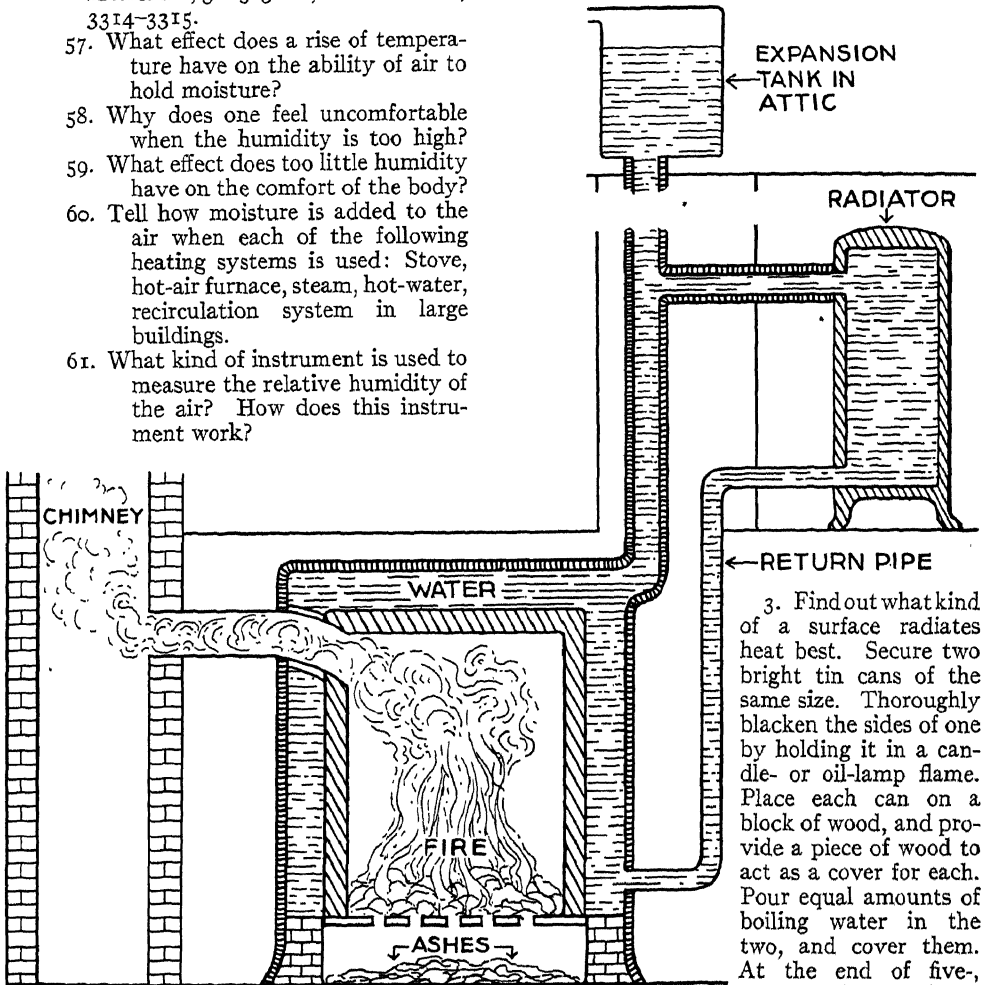
(The Ventilating Problem), 3118-3120; LIFE EXTENSION (Rule 1), 3982.

51. What causes the air in a room containing human beings to become foul?
52. How should a window be arranged for the best ventilation?
53. How may strong winds be tempered for a bedroom when the window is open?
54. How dangerous are drafts?
55. Describe two ways in which disc blowers are used to produce circulation of the air.
56. Where are centrifugal, or fan, blowers commonly used? 802, 3120

C. Moisture in the Air. See HEATING AND VENTILATION (Warm-Air Heating, Recirculated Air), 3116, 3119-3120; HUMIDITY, 3285-3286; HYGROMETER, 3314-3315.

57. What effect does a rise of temperature have on the ability of air to hold moisture?
58. Why does one feel uncomfortable when the humidity is too high?
59. What effect does too little humidity have on the comfort of the body?
60. Tell how moisture is added to the air when each of the following heating systems is used: Stove, hot-air furnace, steam, hot-water, recirculation system in large buildings.
61. What kind of instrument is used to measure the relative humidity of the air? How does this instrument work?

is not warm, it does not have a tendency to rise, but follows any air currents which may exist.



SIMPLE DIAGRAM OF A HOT WATER-HEATING SYSTEM

Things to Do

1. Carry out the experiment described on page 2700. If you do not have a clay pipe and can get a test tube, stopper, and glass tube, they will serve very well, when used as shown in the diagram.

2. Construct a smoke-maker like the one shown in the diagram below. Use this to test the air currents about doors and windows and near warm objects or cold objects. See if there is a convection current above you in a room where the temperature is about 70° F. The smoke made by this device has the advantage of not being so warm as that from a smoking cotton cord or a joss stick, which might be used instead of the smoke-maker. Because it

3. Find out what kind of a surface radiates heat best. Secure two bright tin cans of the same size. Thoroughly blacken the sides of one by holding it in a candle- or oil-lamp flame. Place each can on a block of wood, and provide a piece of wood to act as a cover for each. Pour equal amounts of boiling water in the two, and cover them. At the end of five-, ten-, and fifteen-minute periods, take the temperature of the water in each can. Which kind of surface would be better for the radiator of a heating system?

You could carry out experiments in the same way by painting the cans with different colors of dull-finish paint.

4. Find out all about the heating system in your school building. Write a description of it, and explain how it operates. Diagrams save much writing. (The janitor or engineer of the building will probably be willing to show you about and explain it, if he knows that you really want to learn about the system.)

5. Look in magazines for advertisements of heating systems. Write to a number of companies asking for catalogs or pamphlets describing their systems. Study them to find

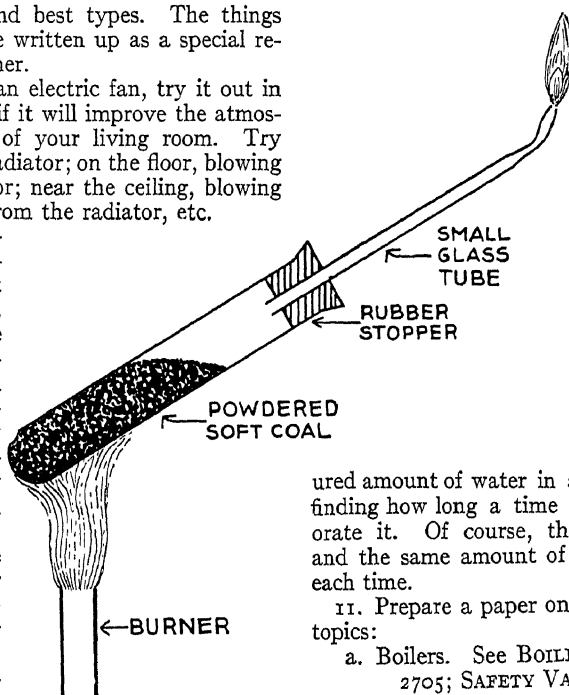
out the newest and best types. The things you learn could be written up as a special report for your teacher.

6. If you have an electric fan, try it out in wintertime to see if it will improve the atmospheric conditions of your living room. Try putting it on the radiator; on the floor, blowing toward the radiator; near the ceiling, blowing downward away from the radiator, etc.

7. Make a hygrometer something like that shown in Fig. 2, page 3315. The thermometers chosen should read alike at room temperature. Any soft, water-absorbing material may be used for a wick around the "wet" bulb. A bottle and tin reservoir could be used to hold the water for the "wet" bulb. Write to the Taylor Instrument Companies, Rochester, N. Y., for their pamphlet, *Tables for Use with Mason's Hygrometers*. This will give directions for finding the relative humidity of the air.

8. Provide some means of humidifying the air in your home. The ordinary pan for furnace or radiator does not provide nearly enough evaporating surface. A wick of absorbent material should be arranged to draw the water up where it will be exposed to the air. This wick should reach to the bottom of the container. Test out its effectiveness by comparing the amounts of water evaporated with and without it.

If you have



SIMPLE APPARATUS FOR DISTILLING COAL

ured amount of water in a saucer or pan and finding how long a time is required to evaporate it. Of course, the same-sized saucer and the same amount of water should be used each time.

11. Prepare a paper on one of the following topics:

a. Boilers. See BOILER, 814-815; GAUGE, 2705; SAFETY VALVE, 6295-6296.

b. The advantages and disadvantages of different types of heating systems.

c. The heating and ventilation of

. . . (Name of some building of which you have knowledge can be inserted here). Any large modern building will provide good material for such a paper. It may be a schoolhouse with heating device of the highest type, or a modern church, or a commercial building in your city. Ask the persons in charge for permission to study it, and for information which will aid understanding.

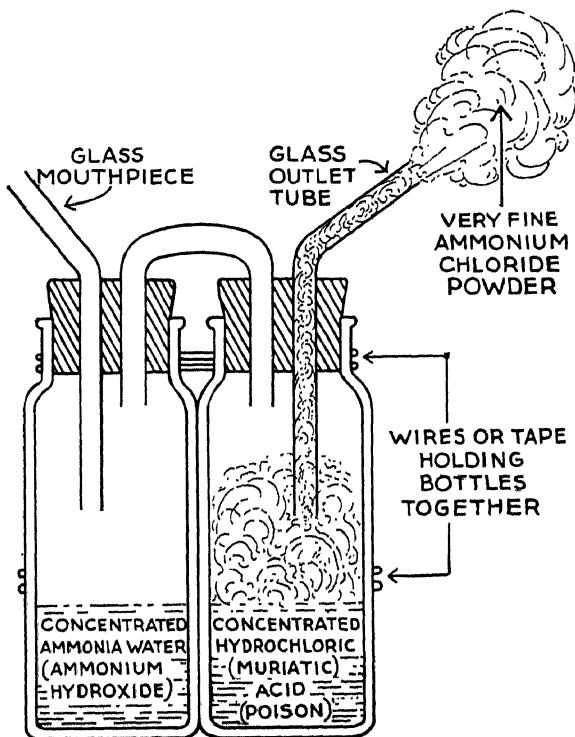


DIAGRAM OF A SMOKE-MAKER

UNIT SIXTEEN

The Work of the Body

Main Understandings

1. The body secures energy to carry on its many activities by the oxidation of food (or of protoplasm) in its cells.
2. Food to keep the oxidation going on is prepared and supplied to the body by the digestive system.
3. A supply of oxygen is provided by the lungs.
4. Materials of all kinds are carried from place to place within the body by the blood or circulatory system.
5. The waste products of the body's activity are removed by a number of organs.
6. The nervous system keeps the different parts of the body working together.

The Activity Going On in the Body

What is the most wonderful thing you know? Many thoughtful people consider man's brain the most marvelous thing known. We look with awe at the great machines which carry us across land and sea and through the air. We marvel at the radio, the telephone, and the printing press. Yet every one of these was planned by man's brain, and the brain is only a part of man's body. Of course, it controls and directs the other parts of the body, but it is absolutely dependent on them for the energy with which to think.

The body needs energy with which to move and to send messages from one part to another. Energy is also necessary to carry on the thinking activity of the brain. Where and how does it get this energy? Your thoughts may already have gone back to what you know about food; how it contains the energy of the sunlight stored there by the green leaves of plants. But do you know how the body gets the energy out of the food?

You have often watched a fire burn. The oxygen from the air unites very rapidly with the wood, and a great deal of energy which was stored in the wood is released as heat and light. The wood disappears, and only ashes are left. A similar thing happens in the body, except that the food, which is the body's fuel, is used up much more slowly, and there is no real fire. Whenever oxygen unites with another material, we call the process *oxidation*. We shall, therefore, call this use of food and release of energy in the body slow oxidation, or just oxidation. We must not call the process *burning*, because it would be incorrect to say burning when there is no fire.

Think of the fire in a stove. Fuel must be put in, air must be let in through the bottom to give its oxygen to the fire, the gases must be let out, and some one must regulate it so it will not burn too rapidly, nor go out. Every little part of the body, every muscle cell, every nerve fiber, and every gland cell, must have energy with which to work. That means that it must oxidize some food or some of its own substance.

Just as the stove was supplied with fuel and air, had its wastes carried away, and was regu-

lated to keep the fire burning properly, so every cell in the body must be supplied with food and oxygen, must have its wastes carried away, and these processes must be carefully regulated. The wonder of it all is that the body does all this work for itself. It has a whole set of digestive organs, whose business it is to change food and dissolve it so it can soak or diffuse into the cells. The lungs are special organs, whose business it is to supply plenty of oxygen for every part of the body. There are billions of cells which need food and oxygen. They cannot all get close to the intestine to get food and close to the lungs to get oxygen, so food and oxygen must be carried to them. The body does this with its blood system. That is why blood is so important. Without it, the cells starve and, at the same time, are suffocated. The blood must also carry the wastes of oxidation away from the cells and give these wastes to the organs whose business it is to take them out of the body. Some of these organs help do other work, and some do nothing but take wastes out of the blood.

Then, the nervous system, the telephone system of the body, connects all these different parts and makes them work together and at the proper rate. No part of the body could get along for a single hour without the service of every one of these sets of organs.

For a long time, scientists have been using their brains to find out how every part of the body does its work. Every one of us should know many of the things they have learned, so that our brains can give our bodies sensible care and cooperation. THE WORLD BOOK contains much of what is known about the work of the body. The Study Outline and the questions will help you find this information. As you read and learn, do not forget that what THE WORLD BOOK is telling you about is going on right inside you all the time.

Study Outline

[Numbers refer to pages in THE WORLD BOOK Encyclopedia. Articles starred (*) are to be read in full.]

- I. **Oxidation, the Release of Energy for the Work of the Body.** See BIOCHEMISTRY (The Derivation of Energy), 742-743; CELLS, 1268; FOOD (The Work of the

Body), 2509; OXIDATION, 5281; OXYGEN (How Oxygen Supports Life), 5281; PROTOPLASM, 5852-5853.

1. Food contains stored energy. When and how was it stored there? (See unit on *Our Foods*.)
2. Why is the oxidation in the body called "slow oxidation"?
3. What materials are used up in oxidation?
4. What materials are formed?
5. Why is oxidation necessary in the body?
6. Where in the body does oxidation take place?

II. Food in the Body. See NUTRITION, 5121-5126.

A. Digestive Organs. See ABDOMEN, 7; ALIMENTARY CANAL*, 221-222; INTESTINE*, 3491-3492; LIVER, 4058-4059; MOUTH, 4702-4703; PANCREAS, 5339; STOMACH*, 6844-6845.

7. Make a list of all the organs which you think are really digestive organs.
8. Make a diagram of the alimentary canal stretched out almost straight. Show that it is a tube. Make each part the correct length in proportion to the others.
9. Describe the wall of the stomach.
10. Is the wall of the small intestine much different from that of the stomach?

B. The Digestion of Food. See BILE, 736-737; DIGESTION*, 1946; MASTICATION*, 4338; also the references under *Digestive Organs*, above.

11. What is digestion, scientifically speaking?
12. Make a list of the digestive juices.
13. How much bile is secreted in a day?
14. What do the digestive juices do?
15. How do the muscles of the alimentary canal aid in digestion?
16. Does any digestion go on in the large intestine?
17. Tell what happens to a piece of food containing carbohydrates, fats, and proteins from the time it is put into the mouth until it is digested.

C. Absorption. See ABSORPTION (In Physiology), 12; DIGESTION, 1946.

18. In what condition must food be before it can be absorbed?
19. Why is digestion necessary?
20. Where is the most of our food absorbed?
21. What is absorbed in the large intestine?

22. What becomes of the parts of the food that cannot be absorbed?

III. Getting Oxygen. See ABSORPTION (In Physiology), 12; BREATH AND BREATHING (What Breathing Accomplishes), 939-940; LUNGS*, 4154-4156.

23. How many air cells are there in the lungs?
24. How does air get into so many air sacs?
25. How large are air sacs?
26. How is the blood brought close to the air in the air sacs?
27. What makes air go into the air sacs?
28. How does the oxygen get into the blood from the air sacs?
29. Draw a diagram to show your idea of an air sac with its bronchial tube and capillaries.

IV. Transportation; the Railroad System of the Body.

A. The Blood Vessels or Tracks. See ARTERIES*, 423; BLOOD (Circulation of), 798-799; CAPILLARIES*, 1183-1184; VEINS*, 7473.

30. Are arteries, veins, or capillaries largest? Which are smallest?
31. Of what use are arteries? Veins? Capillaries?
32. Why are the capillary walls very thin?
33. Why cannot one see capillaries in his skin as he can see veins?
34. Which blood vessels have valves in them?

B. The Blood, or Train. See BLOOD, 796-800.

35. How much blood does your body contain?
36. Give five reasons why the blood is very important in the work of the body.
37. Is food carried in the corpuscles or in the plasma of the blood?
38. In which part of the blood is oxygen carried?
39. Why does blood have a lighter color at some times than at others?

C. The Heart. See HEART, 3108-3111.

40. What does the heart do?
41. Why are there valves in the heart?
42. What two sounds of the heart can the doctor hear?
43. Why are the two sides of the heart completely separate from each other?
44. How much work does the heart do in a day?

D. The Circulation. See BLOOD (Circulation of), 798-799.

45. How long does it take a corpuscle

to make a complete journey from the left ventricle through the circulatory system and back again to the left ventricle?

46. Under natural conditions, do red blood corpuscles ever leave the blood vessels?
47. Name the blood vessels through which a corpuscle would pass on a complete journey, as in Question 45. Thus, heart, artery, etc.
48. Where does the blood get food? Oxygen? Waste materials?
49. Where does the blood leave food? Oxygen? Waste materials?

V. Getting Rid of Waste Materials. See **INTESTINE** (Large), 3491-3492; **KIDNEYS***, 3772; **LIVER**, 4058-4059; **LUNGS**, 4154-4156; **PERSPIRATION**, 5505; **SECRETION**, 6477; **SKIN**, 6632; **URINE***, 7421.

50. What is the difference between secretion and excretion?
51. Of all the organs which help eliminate waste material, all but one have their wastes brought to them by the blood. Which one does not?
52. Carbon dioxide is formed by oxidation in the cells. How does it get out of the body?
53. How does the liver help the kidneys take the wastes of proteins out of the body?
54. Of what value is perspiration to the body?
55. Why is the urine such an important indicator of health or disease?

VI. Control of the Body. See **BRAIN**, 918-921; **NERVES***, 4880-4881; **NERVOUS SYSTEM**, 4881-4883; **REFLEX ACTION**, 6036.

56. Why is the nervous system said to be the telephone system of the body?
57. How is a nerve like a telephone cable? (See illustrations of telephone cables, 7079, 7080.)
58. How many cells are there thought to be in the brain?
59. What is a reflex act? How is it different from a voluntary act?
60. Are digestion, breathing, and circulation controlled by reflex acts or voluntary acts? Why is this better?

Things to Do

1. Chew up a cracker but do not swallow it. Note the taste carefully. Keep on chewing it as long as you can. Does the taste change? Why?

2. Put a spoonful of sugar in a half glassful

of water. Watch it carefully while stirring. What becomes of the sugar? Taste the water.

3. Get a small bottle of hydrochloric (muriatic) acid at the drug store. Be careful not to have any of it get on your skin. Break a piece of marble or limestone into small pieces with a hammer. Put them in a third of a glass of water, or in some water in a test tube. Shake or stir them up occasionally, for a day. Do they dissolve? Add a teaspoonful or more of the acid. Do they dissolve now?

4. Find a partner who is interested in finding out about the organs of the body. Have him put on some old dark clothes. Take a piece of chalk and draw the outline of his lungs, heart, stomach, large intestine, and kidneys on his clothes. Let him do the same for you.

5. Of course, you have felt your pulse in the groove near the upper inside part of your wrist. Try to find other places where you can feel the pulse. There are a great many of them. (Use a finger rather than a thumb when feeling for the pulse.)

6. Put the following organs in their correct order: Salivary glands, pancreas, oesophagus, large intestine, liver, stomach, small intestine, mouth. Place parentheses around the ones which are hollow to hold the food.

7. Take a dull pin and touch it lightly to the skin on the back of the hand. Can you find any place where you cannot feel it?

8. Get a friend or so to do this with you. Count your heart beats for a minute while you are both standing. Who has the most? Now lie down for five minutes and count them for a minute again (while still lying down). Run upstairs together and count again. What do you find out about your heart?

9. Have two or three friends sit at a table, each with a light stick or ruler held a foot above the table. Tell them that when they see you raise your pencil off the table they are to strike the table as quickly as possible. Do they all strike at the same time? Who is quickest? The time between the signal and the movement is called the *reaction time*. You can think of other ways of testing it. Try a sound as a signal when you are behind those you are testing.

10. Have a friend face the window in bright daylight. Cover one of his eyes with a dark card for a half minute. Take it away suddenly and watch the pupil of the eye closely. What it does is called a reflex action.

11. Sit upright in a chair and cross one knee over the other. Strike the knee lightly with the side of your hand just below the knee cap. Can you make your foot kick out even though you try to hold still? This is a reflex action called the knee jerk, and is used by doctors to test your health.

12. Have a contest to see who can make the most dots on a piece of paper in a half minute.

One person should tell when to start and when to stop by tapping on the table with a ruler.

13. Another test of muscular control is to see who can draw the straightest line across a piece of paper.

14. The following are good topics for compositions:

- a. Advantages and disadvantages of oxidation. Besides the references in the Study Outline, see COMBUSTION, 1580; LINSEED OIL, 4036; OILS (Drying), 5179; PAINT, 5298; RUST, 6281.
- b. The work of the white corpuscles. See BLOOD, 797.

- c. The heart. See HEART, 3108-3111.
- d. The senses. See SENSES, SPECIAL, and references given at end of the article.
- e. Wonders of the eye. See EYE, 2349-3454.
- f. How we hear. See EAR, 2075-2078.
- g. How muscles and bones work together. See MUSCLES, 4749-4751; SKELETON, 6631-6632, and lists.

Answers:

6. Mouth, (salivary glands), oesophagus, stomach, (liver), (pancreas), small intestine, large intestine.

UNIT SEVENTEEN

Dependent Plants

Main Understandings

1. Most dependent plants get food from other plants or animals because they lack the chlorophyll with which to make their own.
2. There are many different kinds of dependent plants.
3. In securing their food, dependent plants are both helpful and harmful to man.

Plants Which Use Prepared Food

It is summer time. Green color is everywhere. Lawns and gardens, fields and forests are clothed in it. It is pleasant and restful to our eyes and so common that our attention is immediately drawn to the flowers of different color that blossom among the green leaves. Those of us who have been curious enough have found in this green color a wonderful secret of nature—it helps plants use sunlight to make food. Animals do not have the green chemical called *chlorophyll*, and so they must get their food from plants.

There are many plants, too, which do not have chlorophyll. If you have eyes for surprises, you have often had a pleasant little thrill as you passed a familiar lawn. There, after a warm, damp night, an impertinent mushroom had pushed its head up through the earth. It may even have had a spear of grass sticking on its cap. Why wasn't this mushroom green? Where were its leaves?

That is another of nature's secrets. The mushroom is never green, and lacking green color, it has no use for leaves to catch the sunlight. It belongs to a group of plants which have no real leaves or roots or stems, or even seeds. And, what is more, the mushroom you saw wasn't the real plant at all. It was just the fruit. If you had dug down in the dark soil under the mushroom, you would probably have found a rotten stick or a mass of decaying leaves. Around and through the mass of material would have been something that you would have taken for mold. This was the real mushroom plant. It had to be there, for it was getting its food from the wood or leaves of some other plant.

It is not strange, either, that the real mushroom plant looks like mold, for the molds that grow on rotting fruit, on bread and cheese and old shoes, are its cousins. There are other cousins, too, whose threadlike growth is never seen, but only their fruit, as we see that of the mushroom. These cousins are the rusts of grains and grasses and many other plants, and the smuts of corn, wheat, and oats, which do so much harm. The red masses of the rusts and the black of the smuts are the spores of the plants. The real plants grow inside the tissues of the green plants and steal nourishment from them.

All these strange plants and others which do not have chlorophyll, or leaves, or stems, or roots, and which have spores instead of seeds, are called fungi. There are so many different kinds of fungi that no one has ever been able to study or even to name all of them. Scientists think that there must be at least 250,000 of them. They grow almost everywhere, and their spores are always floating as dust in the air, so that they may grow wherever they find the right conditions. *

Bacteria are also plants which do not have chlorophyll, and so must depend on other plants, or on animals, for food. They are the smallest plants known. No one can see any of them without a microscope, and the smallest of them cannot even be seen with the most powerful microscope ever made. No one knows how many different varieties of bacteria there are. They, like the spores of fungi, are almost everywhere, inside us and on us, in the air and in soil and water.

A number of seed plants are also dependent on other plants for a part or all of their food. The mistletoe, which helps make Christmas a

romantic holiday, is a parasite. Although it is green, it grows on the wood of trees and gets some of its food and moisture from them. Dodder, a light-orange twining vine, is a parasite, which grows from a seed like any other plant. As soon as it touches a suitable plant, little suckers are formed to gather food from its neighbor, and then the root of the dodder dies. This plant often does much damage by killing the clover and alfalfa in hayfields. In the woods, one sometimes finds a snow-white or somewhat colored cluster of "Indian pipes" sticking up through the leaves. These are the stems and flowers of another plant which cannot make food. Besides these, there are a number of others which are not often seen.

Did you know that there are plants which catch and digest insects? In some swampy places or bogs, plants find it hard to get enough nitrogen to grow well. We find there a whole group of plants which have traps of various kinds for catching insects. Such plants have chlorophyll, and they make carbohydrates, but they seem to find it necessary to get their nitrogen from animals. The better-known insect-eating plants are the pitcher plants, the sundew, and the Venus's flytrap.

Dependent plants are interesting, not only because they are different, but because they are important. As they use parts of animals and plants for their food, they decompose them and help them to change back into soil. If it were not for fungi and bacteria, the whole earth would be littered with the bodies of dead animals and with the leaves and limbs and stumps of trees. Sometimes, too, in getting what they need to live, these plants make chemical substances which we want. The yeast in the bread dough uses sugar, but makes carbon dioxide, which raises the bread. Yeast in cider spoils the cider, but makes from it alcohol. Then bacteria change the alcohol into vinegar. Certain molds give cheese a flavor that many people like. Bacteria in the soil make it fertile, and help plants to grow. So you see we couldn't very well get along without them.

On the other hand, there are a great many of the fungi and bacteria that we would like to get along without. In securing food for themselves, some spoil the meat, bread, and fruit that we want for food. Others rot our fences, boats, and buildings. Still others grow on the green plants that make our food. Some kill our shade trees and our flowers. Certain kinds make our pets and livestock sick. Some even grow on our skins and in us, and make us sick. These are plants we have to fight against all the time.

If you wish to know more about these strange plants, turn to the references in the Study Outline, below, and read the articles about them in *THE WORLD BOOK*.

Study Outline

[Numbers refer to pages in *THE WORLD BOOK Encyclopedia*. Articles starred (*) are to be read in full.]

I. How Dependent Plants Get Food.

A. Their Inability to Make Food. See Study Outline on Food (Where Our Food Comes From) and references there; FUNGI, 2637; MUSHROOMS (How the Mushroom Gets Its Food), 4755.

A. 1. What is the most important difference between dependent plants and independent plants?

2. Where do fungi get their food?

B. Parasites and Saprophytes. See BACTERIA (Activities of Bacteria), 567; FUNGI, 2637; PARASITES (Plant), 5363-5365.

3. What is the difference between parasites and saprophytes?

4. Name three plant parasites and three saprophytes.

5. What are the largest plant parasites of the United States?

6. What kind of plants are the smallest parasites?

II. Kinds of Dependent Plants.

A. Bacteria. See BACTERIA AND BACTERIOLOGY, 566-567; BOTANY (Thallophytes), 888.

7. How large is a bacterium?

8. What different shapes do bacteria have?

9. How do some bacteria move?

10. How many bacteria could come from a single parent in twenty-four hours, if conditions were favorable?

11. Name a disease caused by 1 bacilli, one caused by 1 spirilla, and one caused by micrococci.

12. Why are bacteria placed in the group of plants called thallophytes?

13. How can bacteria be grown for study?

14. What is a pure culture of bacteria?

15. How do bacteriologists tell the tuberculosis bacilli from other kinds?

B. Fungi. See BOTANY (Thallophytes), 888; FUNGI*, 2637; LICHENS*, 3975; MILDEW, 4473; MOLD*, 4572-4573; MUSHROOMS, 4754-4758; RUSTS*, 6281-6282; SLIME MOLDS*, 6642; SMUTS, 6656; YEAST, 7930-7931.

16. How are fungi different from rose bushes?

17. Where are slime molds found?

18. Do you think that you have ever seen slime mold? How do you know?

19. Where have you ever seen mold growing?
20. Why does mold grow on bread that has been unwrapped and not on that which is carefully wrapped?
21. What kind of cheese owes its flavor to mold?
22. What part of the plant is the mushroom that we see growing in the ground or on stumps?
23. What is the food of the mushroom?
24. What is a young mushroom called?
25. Do mushrooms ever grow on living plants? How does this fact classify them?
26. What is mushroom spawn?
27. Where are the gills of a mushroom, and what are they for?
28. What is a fairy ring of mushrooms? How is it formed?
29. How many kinds of mushrooms are known?
30. Which kind of mushroom is star shaped?
31. Which kind of mushroom has a poison that acts like the poison of a rattlesnake?
32. Which mushroom is said to have killed a czar of Russia?
33. Are mushrooms really a very nourishing food? Why are they eaten?
34. Why are some fungi called rusts?
35. How does rust spread from one plant to another?
36. What effect does black stem rust have on wheat?
37. How can one recognize smut on grain plants?
38. Of what two kinds of plants are lichens made?
39. Would you say that lichens are really dependent plants?
40. What is yeast?
41. How could you get yeast plants without buying yeast from a store?
42. How many cells do most spores have?
43. How could you tell a seed from a spore? See SEEDS (Parts), 6479-6480; SPORE*, 6777.

C. Seed Plants. See DODDER*, 1984-1985; MISTLETOE*, 4560; also BLADDERWORT*, 785; BUTTERWORT*, 1051; CARNIVOROUS PLANTS*, 1205; PITCHER PLANTS*, 5630; SUNDEW*, 6926; VENUS'S FLYTRAP*, 7490.

44. How does dodder begin its life?
45. How do dodder plants get their nourishment?
46. How does dodder spread after it has started its growth?

47. Where does mistletoe grow?
48. Why is mistletoe not an entirely dependent plant?
49. How do birds help mistletoe?
50. What is a carnivorous plant?
51. Where do carnivorous plants grow?
52. Do you think carnivorous plants should be called dependent plants?
53. Which plant do you think has the best method of capturing insects?

III. The Importance of Dependent Plants. See BOTANY (Contribution to Human Welfare), 892; FERMENTATION*, 2396; LEGUMINOUS PLANTS 3925; PARASITIC DISEASES, 5365; RINGWORM, 6130-6131; VINEGAR, 7531; also the references under the preceding topics.

54. Make two lists, one of all the helpful activities of dependent plants you can find, and then another list giving harmful activities. Which list is longer?
55. Do bacteria themselves cause fermentation or do chemicals which they make cause the process? Explain.
56. How do bacteria help make vinegar?
57. How does yeast make bread rise?
58. How are clover plants helped by bacteria?
59. What kind of a plant causes ringworm?
60. Would you be willing to have all bacteria and fungi destroyed if that were possible? Why?

Things to Do

1. Dig up any clover or bean plant with a shovel or trowel. Wash off the soil and examine the roots for little lumps called *nodules*, formed by nitrogen-gathering bacteria.

2. Grow some bread mold. Do this by turning a small plate upside down in the bottom of a saucepan. Cut a slice of bread and allow some dust to fall on it. Then place it on the bottom of the plate in the pan. Put the pan in a warm place, where it will not be disturbed. Pour a little water in the bottom of the pan, but do not let it come up to the bread, although it will help if you sprinkle the bread with a little of the water. Cover the pan with a larger plate, and do not disturb for three or four days.

It would be interesting to prepare another slice of bread like the first and try to keep the mold spores out. Take a loaf of bread which has never been unwrapped, and cut off two slices with a clean knife. Have your pan prepared and covered. Place the second slice in the pan, and cover it immediately. Put

this pan in the warm place with the first one, and see if there is any difference in the amount of mold that appears.

3. Make a "spore print" from a mushroom. This is done by cutting the cap of a mushroom from the stalk or stipe, so that it can be placed flat on a piece of clean paper. If the mushroom is of the proper age and is left on the paper for a time, the spores will form a clear pattern on the paper. This pattern is different and of different colors when made with different kinds of mushrooms. Perhaps you can find a way to preserve spore prints and make a collection of them.

4. Would you like to catch some yeast? Probably the first thing to do is to grow some yeast, so you can tell how it acts. You may grow yeast by putting a small spoonful of corn syrup in a glass of warm water and stirring it until the water and syrup are thoroughly mixed. Put a small piece of a cake of compressed yeast in the mixture and stir it up. Set your culture in a warm place, and examine it from time to time. Look for bubbles and for the appearance of a yeasty odor.

To catch yeast from the air, you may prepare a second glass of sweetened water like the first. Allow this glass to stand uncovered so that the dust from the air will fall into it for several hours. Then put it in a warm place and see if it will act like the one in which you put the yeast. If you are successful, it will probably take longer than it did with the first glass, but it will act similarly.

5. Make some apple vinegar. Run one or two apples through a food chopper and strain the juice out of the pulp with a small strainer or piece of cloth. Let this stand in the open for a few hours, and then cover with a cloth and put in a warm place. It should ferment and act much like the sugar solution in which you placed the yeast. The sugar will have been changed into alcohol when the fermentation ceases. The fermented juice should now be placed in a large bottle, but not corked. If left for a month or so, it should change into vinegar by the action of bacteria. This change may be speeded up by putting some "mother," or slimy material from vinegar, into the juice.

6. Make a collection of all the different kinds of fungi you can find. Dry them and keep them in cardboard boxes. Each specimen should be labeled with the date and place where you found it, the kind of material or plant on which it was growing, and the name, if you can find it. Some botany teacher or agricultural agent will probably be glad to help you name some of them. Look for rusts, smuts, and mildews on plants, as well as for the better-known mushrooms and puffballs.

7. If you can get a microscope to use, examine tiny bits of mold to see what they look like. Can you see the spores? Look at differ-

ent kinds of molds and other fungi. Look at a drop of the cloudy material from your yeast cultures. If your microscope is powerful enough, you should be able to see the tiny oblong yeast plants and perhaps the buds which grow from them to make new plants.

8. Make a collection of lichens. These are the gray and greenish crusts which grow on undisturbed rocks, on old tombstones, on tree trunks and rotting logs in the woods, and sometimes on the ground. They may be preserved in the same way as the fungi. Look particularly for lichens with spore cups on them.

9. Fill in the blanks in the following ten statements so that each sentence will read correctly. Use only one word where each blank appears:

- a. Most dependent plants do not have _____ with which to make food.
- b. A parasite gets its food from _____ plants or animals, but a saprophyte lives on _____ plants or animals.
- c. Rod-shaped _____ are called bacilli.
- d. Mold is spread by means of _____, but dodder grows from _____.
- e. _____ are grown from spawn which the grower buys.
- f. Most diseases of men and animals are caused by _____.
- g. Such plants as mushrooms, rusts, smuts, and mold are all members of a large group of simple plants called _____.
- h. Bread rises because _____ in the dough makes a ferment which changes _____ into alcohol and _____.
- i. Dependent plants cause _____ and thus destroy the bodies of dead plants and animals.
- j. Plants which catch and digest insects are called _____ plants.
10. Write an essay for your teacher on one of the following topics. Use the references given in the Study Outline. Prepare an outline of what you are going to write before you start writing.

- a. How Insect-Eating Plants Catch Their Food.
- b. What Would We Do without Dependent Plants?
- c. Plant Diseases.
- d. Plant Parasites.
- e. The Kinds of Fungi.

Answers:

9. a. chlorophyll. f. bacteria.
- b. living, dead. g. fungi.
- c. bacteria. h. yeast, sugar, carbon dioxide.
- d. spores, seed. i. decay or decomposition.
- e. mushrooms. j. insectivorous or carnivorous.

UNIT EIGHTEEN

Germs and the Body

Main Understandings

1. Germs are unicellular (one-celled) plants and animals which cause disease.
2. Germs are carried from sick persons to well ones in many ways.
3. When germs get into the body they injure it by destroying cells or by producing poisons.
4. The body has ways of protecting itself against the entrance and action of disease germs.
5. We can help the body protect itself against germs.

What We Know about Germs

A Dutchman, born nearly three hundred years ago, was the first person who ever saw a microbe. This man, whose name was Leeuwenhoek (*la' ven hook*) made microscopes "just for fun," and learned to make better ones than had ever been known. One day he was looking through one of his microscopes at a drop of water and discovered that it was full of tiny living things. After that he looked for microbes almost everywhere—and found them! Men said they grew from the soups and slime and water in which they were found, for in those days they even believed that if a pile of rags and some grain were placed in a corner, mice would be produced. In time scientists proved that either mice or microbes could be produced only from mice or microbe parents.

Two hundred years after Leeuwenhoek had discovered the existence of microbes, an obscure German doctor, named Koch, neglected his patients to work with a microscope his wife had given him on his twenty-eighth birthday. He proved that a terrible disease called anthrax, which killed both men and animals, was caused by microbes similar to those which Leeuwenhoek had seen. A Frenchman, Pasteur, had already proved that a certain silkworm disease was caused by germs, and that it could be controlled by being careful to raise young silkworms from healthy parents in places where there were none of the germs. He had predicted that men would soon discover that the diseases which spread so mysteriously over Europe were caused by germs. After Koch had discovered the cause of anthrax, Pasteur found a way to weaken the germs so that they would make sheep or other animals only a little sick, and then, when the animals got over the slight attack, they couldn't take the genuine disease. Koch, too, kept on working, and he discovered that tuberculosis, which in those days caused one death out of every seven, was due to a certain kind of germ. Still later he found that the Asiatic cholera germ was a peculiar comma-shaped germ.

We now know that each of many diseases is caused by a certain kind of germ which the bacteriologists and doctors can recognize. Certain diseases seem to act just as if they were caused by germs, but if they are, the germs are too small to be seen with a micro-

scope, and they can pass right through a filter made of porcelain. The material which causes such a disease is, therefore, called a filterable virus. A few terrible infections, such as blood poisoning and lockjaw, are caused by bacteria often found in the soil.

Communicable diseases could be kept from spreading and could be conquered if we could only keep the germs or viruses from getting from sick persons to well ones. This is not as easy as you might think. Some bacteria form tiny spores which live a long time and resist drying and heat. Certain germs or their spores get into drinking water and food. Others float in the air as dust and in little drops of moisture ejected from the noses and mouths of sick people. Still other germs are carried by insects that bite us and get on our food. Having discovered these facts, we try to exterminate insects; we shut sick people away from well ones; we purify our drinking water and cook our food; we use antiseptics on our bodies, and disinfect places where germs may live. By taking such precautions, we have greatly reduced the number of cases of germ diseases.

Germs make us sick in at least two ways. Some kinds feed on the cells of which the body is made, and thus injure or destroy them. This, of course, weakens the body so that it cannot do its work well. Other kinds do not destroy so many cells, but they produce poisons, or toxins, which in some cases are more deadly than the venom of a rattlesnake. The germ of lockjaw, for instance, may grow in a thorn-prick in the foot. The deadly toxin the germs make travels up through the nerves to the spinal cord and brain. It injures the nerve cells, and these make the muscles draw the body into terrible positions until death relieves the person's suffering.

Our bodies are not powerless before the attacks of all germs, however. If we are in very good health all the time, such germs as those of pneumonia and tuberculosis find it almost impossible to make us sick. The skin is a barrier to germs. If we take care to kill any germs that may get into cuts, about the only way they can then get into the body is through natural openings like the mouth, nose, and eyes. Even if the germs do get inside the body, they are met by a great army of microbes, called white corpuscles, which move about and

do their best to swallow the invaders. The body also manufactures chemicals to help overcome the germs and their poisons. Some of these chemicals, which are called antibodies, actually dissolve germs; others make the germs appetizing to the white corpuscles, and still others make them stick together so that they are easier for the white corpuscles to swallow. Other chemicals, known as *antitoxins*, are able to neutralize the toxins and keep them from doing serious injury.

After a person's body has overcome a particular kind of germ disease it is full of the chemical defenders, and the germs of the particular disease from which the person has recovered will not be able to hurt him as long as these defenders remain on guard. This fact gave Pasteur and other scientists a clue to another way to fight disease. If they could get the body to make the chemicals without being very sick, then it would be protected from the disease for a long time. So now doctors put weak or dead germs or small amounts of toxin into our bodies and are quite successful in protecting us from such diseases as smallpox, typhoid fever, and diphtheria. They even treat horses with toxins, and get the horses' bodies to make a great deal of antitoxin. Then they take the antitoxin from the horses' blood and use it to help cure disease in human beings.

Since the days of Pasteur and Koch (Koch died in 1910), thousands of men all over the earth have been constantly working over test tubes and microscopes, and making experiments to learn the secrets of germs. Many of them have contracted the diseases they were studying, and some have died. But the knowledge which has been gained has saved the lives of millions of people. Where a thousand died from the attacks of germs a few years ago, only about four hundred die now. But we don't yet know enough, and we haven't been careful enough, completely to wipe out these enemies of man. Most of us have colds or the "flu" each year. One of every six hundred people in the United States dies from tuberculosis or pneumonia during every twelve months. One in each nine hundred dies from some other germ disease. Then, too, while the scientists are finding out how to prevent or cure the diseases which they already know, new ones appear, and new battles must be begun.

To do your share in this war against germs, you should know as much as you can about them and their effects. You should use that knowledge to protect yourself and others from them. A few hours of reading and study of THE WORLD BOOK articles relating to germs will add much to your knowledge. See related subjects under the article GERM, and those under BACTERIA AND BACTERIOLOGY.

Study Outline

[Numbers refer to pages in THE WORLD BOOK Encyclopedia. Articles starred (*) are to be read in full.]

I. The Nature of Germs.

A. The Cause of Disease. See DISEASE (Germ Theory of Disease), 1959-1960; PARASITIC DISEASES, 5365.

1. Who proved that diseases are caused by germs?
2. Why is "germ theory" not a good term?
3. What two kinds of germs are there?
4. How do scientists prove that a certain germ will develop a disease?
5. What kinds of diseases are not considered germ diseases?

B. Bacteria. See BACTERIA AND BACTERIOLOGY, 566-569.

6. How large are bacteria?
7. Are they plants or animals?
8. How are bacteria able to move about?
9. What is the difference between bacilli and micrococci?
10. Name one disease caused by each of the three types of bacteria.
11. What are pathogenic bacteria?
12. What are the three most effective ways of killing bacteria?
13. How do bacteriologists tell the tuberculosis germ from other kinds?
14. What is a filterable virus? See VIRUS*, 7547.

C. Protozoa. See PROTOZOA, 5853; ZOOLOGY (The Work of Parasites), 7984.

15. What are protozoa?
16. Name three diseases caused by protozoa.
17. How do protozoa multiply?
18. Why are ticks and mosquitoes very necessary to some protozoa that cause disease?

II. Preventing Transmission of Germs. See DISEASE (Prevention of Germ Disease), 1960.

A. Prevention of Contact and Direct Communication. See accounts of diseases referred to below, especially TUBERCULOSIS (Transmission), 7287, (Prevention), 7288; QUARANTINE*, 5903-5904.

19. Make a table with two columns. On one side make a list of all the ways germs may be passed from one person to another. In the second column, opposite each way you give, tell how to prevent the spread of germs in this way.
20. What is quarantine?

21. For what diseases are homes commonly quarantined?
22. How do quarantines help to stop the spread of disease?
23. Why doesn't the quarantining of all cases of disease stop its spread immediately?
- B. **Combating Insects.** See FLEA, 2468; FLY*, 2498-2503; INSECTS (and Disease), 3463; LOUSE, 4137; TICK, 7170-7171; TSETSE FLY*, 7285-7286.
24. What diseases are carried by each of the insects listed in the references?
25. Describe two experiments which helped to prove that mosquitoes carry malaria.
26. Give three ways in which the malaria mosquito differs from the common variety.
27. How was it proven that mosquitoes carry yellow fever?
28. How long did it take to make the Panama Canal Zone a fit place in which to live?
29. What man had the most to do with the sanitation of the Canal Zone?
30. How is the fly's method of carrying disease germs different from that of the mosquito?
31. Why is the common house fly sometimes called the typhoid fly?
32. Can the house fly bite?
33. If no flies were killed, how many descendants might one fly have in six months?
34. What do you think is the most important single means of controlling the fly?
35. Where does the tsetse fly live?
36. Are ticks dangerous to men? Why?
37. How do fleas aid in spreading the plague?
- C. **The Use of Germicides.** See ANTISEPTIC*, 312-313; BORACIC ACID, 862-864; CARBOLIC ACID, 1191-1192; CHLORINE, 1406; CORROSIVE SUBLIMATE, 1699-1700; DISINFECTANTS*, 1964; FIRST AID TO THE INJURED (Infection), 2436; FORMALDEHYDE, 2542; FUMIGATION, 2635; HYDROGEN PEROXIDE; IODINE, 3502.
38. What, in general, is the difference between antiseptics and disinfectants?
39. Which germicides are suitable for killing the germs which may be found in a cut?
40. Which germicide is commonly used in drinking water?
41. What gas is best for fumigating a sickroom?

III. How Germs Make Us Sick.

- A. **The Effects of Germs.** See ANTITOXIN, 313; DISEASE (Germs in the Human Body), 1960; LOCKJAW, 4075-4076; SERUM THERAPY, 6504; TOXINS*, 7229; TUBERCULOSIS (Cause), 7287.
42. In what two ways may germs injure the human body?
43. What is a toxin?
44. Give two examples of the effect of toxins on the body.
45. Which effect of germs do you think is more noticeable in advanced cases of tuberculosis?
- B. **Kinds of Diseases.** See CHICKEN POX*, 1368; CORYZA*, 1701-1702; CHOLERA*, 1407; BOIL*, 813-814; DIPHTHERIA*, 1954-1955; EPIDEMIC*, 2279; ERYSIPELAS, 2291; HYDROPHOBIA, 3308-3309; INFANTILE PARALYSIS, 3446-3447; INFLUENZA, 3449-3450; LEPROSY, 3938-3942; LOCKJAW, 4075; MALARIA, 4236; MEASLES, 4358-4359; MENINGITIS, 4392; MUMPS, 4740; PLAGUE, 5641; PNEUMONIA, 5676-5677; SCARLET FEVER, 6409-6410; SLEEPING SICKNESS (African), 6641-6642; SMALLPOX, 6645; TUBERCULOSIS, 7287-7288; TYPHOID FEVER, 7340-7341; TYPHUS FEVER, 7341-7343; WHOOPING COUGH, 7756; YELLOW FEVER, 7932-7933.
46. Name two great epidemics of disease which have swept whole countries or the world.
47. Name two diseases:
 - a. Caused by a known form of bacteria.
 - b. Caused by a known form of protozoa.
 - c. Caused by a filterable virus.
 - d. Always fatal.
 - e. Carried by mosquitoes.
 - f. Noticeable skin eruption.
 - g. Serious after-effects.
 - h. Produce permanent immunity.
 - i. Seldom serious, if cared for.
 - j. Principal effects are on the nervous system.
48. From the list of diseases to which reference is given, pick the three that you believe most harmful to the people of the world.

IV. The Body's Defenses.

- A. **The Skin, a Barrier.** See DISEASE (Germs in the Human Body), 1960; SKIN, 6632-6634.
49. What part of the skin do you think is most effective in keeping germs out of the body?
50. What natural openings through the skin often allow germs to enter the body?

B. The White Corpuscles. See BLOOD (Composition of), 797.

51. How do the white corpuscles help the body in its efforts to fight germs?

C. Chemicals. See ANTITOXIN, 313; MEDICINE (How the Body Makes Its Own Medicine), 4375-4376.

52. What causes the body to manufacture antitoxin?

V. Helping the Body Defend Itself.

A. Maintaining High Vitality. See CORYZA, 1702; INFLUENZA, 3450; LIFE EXTENSION (Fifteen Rules), 3982-3991; PNEUMONIA, 5677; TUBERCULOSIS (Prevention), 7288.

53. When are the germs of such diseases as pneumonia and tuberculosis most likely to make a person ill?

54. List three health habits which you think are most important in keeping up one's resistance to disease.

B. Use of Artificial Antitoxins. See ANTITOXIN*, 313; IMMUNITY (In Medicine), 3369; SERUM THERAPY, 6504; and the diseases listed under III, B, (Kinds of Diseases).

55. How is antitoxin secured in large amounts?

56. For what diseases do we have effective antitoxins?

57. What is your understanding of passive immunity?

58. For how long will diphtheria antitoxin make a person passively immune?

C. Production of Active Immunity. See DIPHTHERIA (Prevention), 1954-1955; IMMUNITY (In Medicine), 3369; INOCULATION, 3457; MEDICINE AND DRUGS (Vaccination), 4376; VACCINATION, 7439.

59. What is active immunity? How is it produced?

60. What is the difference between the ways of producing active immunity for smallpox, for diphtheria, and for typhoid?

61. How long after being administered does the protection of the toxin-antitoxin treatment for diphtheria last?

Things to Do

1. Read the book called *Microbe Hunters*, written by Paul de Kruif.

2. Survey your neighborhood for fly- and mosquito-breeding places. First prepare a large map of your block or home neighborhood. As you make the survey, mark on the map the suspicious places you find, using different marks

to indicate whether it is a fly- or mosquito-breeding place.

3. Destroy these fly- and mosquito-breeding places in your neighborhood, if possible.

4. Make a flytrap, and see how many flies you can catch.

5. Try to raise some mosquitoes in an aquarium made from a glass or jar. It will probably be necessary to put a leaf or some grass in the aquarium and set it outdoors until some mosquito lays eggs on the water. Be sure not to let mosquitoes into your home. Cover the glass with a piece of thin cloth.

6. Look up statistics on the causes of deaths. Which germ diseases seem to be the most dangerous? Make a graph (see GRAPH, 2911, for three different styles) showing what you have found.

7. Make a scrap book of significant articles relating to germ diseases, epidemics, quarantines, etc. Such articles may be found in many magazines and in newspapers. Bind your book neatly, after providing fly-leaves, title page, and table of contents. To make a table of contents which will be satisfactory, it will be necessary to arrange your articles systematically.

8. Ask your family doctor to let you watch him give treatments such as vaccination for smallpox or toxin-antitoxin injections for diphtheria. Perhaps he would let you have a bottle or package after it has been emptied.

9. Prepare a paper on one of the following topics:

a. Leaders of the war against disease. See GORGAS, 2875; KOCH, 3811; LISTER, 4045; PASTEUR, 5411-5412.

b. The kinds of germs. See references in section on *Medicine and Drugs*, earlier in this volume.

c. Germicides. See the same references as above.

d. The treatment and prevention of disease by the use of inoculation and antitoxin injections.

e. Insect carriers of disease.

10. Test yourself by matching the following terms and phrases:

a. Protozoa	a. are round.
b. Bacilli	b. are animals.
c. Bacteria	c. are pathogens.
d. Cocci	d. are poisons.
e. Spirilla	e. are cork-screw-shaped.
f. Germs	f. are rod-shaped.
g. Toxins	g. are plants.
h. Antitoxins	h. produce passive immunity.

Answers:

10. a and b.	e and e.
b and f.	f and c.
c and g.	g and d.
d and a.	h and h.

UNIT NINETEEN

Simple Machines for Doing Work

Main Understandings

1. Work is the overcoming of resistance.
2. A machine is a device which increases the effectiveness of a force in doing work.
3. There are but a few types of simple machines.
4. Complicated machines are made up of a number of simple machines.
5. Machines increase the effectiveness of forces (a) by increasing the amount of force but lessening the distance it can go, (b) by increasing the distance a force can go, but lessening its amount, and (c) by changing the direction in which a force moves.
6. Some of the work put into a machine is always lost in friction; that is, we never get out of a machine as much usable energy as we put in.

The Importance of Simple Machines

You have often heard it said, no doubt, that this is a "machine age." But did you ever think that man is a machine-using animal, and that the machine age really began when man himself appeared on the earth? If not, it is probably because you did not know just what a machine is. Such crude things as sticks, stone axes, oars and arrow heads are just as truly machines as the most up-to-date reaper, typewriter, or sewing machine. They are machines because they help in doing work. Man has always used them, for he has intelligence enough to know that they help him, and he has hands with which to use them. The chief differences between the intricate machines of the present day and the crude implements and tools which the savage used, lie in the number of parts of which the machines are made, and in the materials out of which they are constructed. Early man did not know how to find and use the metals which are the materials best suited for the making of machines. Neither did he know how to put complicated machines together, even if he had felt the need for them.

If you will look closely at a great machine, you will soon begin to see that it is made up of different simple parts, each of which resembles, at least in principle, some common device or tool. Many of the parts of a complicated machine can be grouped in a class with the brake and the gearshift levers of a car. Others operate like the steering wheel or the crank of a car. Then there may be cutting or splitting devices, sloping surfaces, screws and bolts, and pulleys. These six groups are known to scientists as the six types of simple machines, which they name levers, wheels and axles, wedges, inclined planes, screws, and pulleys.

Many of our very commonest devices are simple machines. Oars and crowbars are levers; chisels and knives are wedges; door knobs and screw drivers are wheels and axles; stairways and sloping walks are inclined planes; screws and pulleys can be recognized all about us. But some of our other very common devices are combinations of simple machines.

For instance, a can opener must have at least a wedge-like cutter and a lever to give force enough to cut the metal of the can. Even a pair of scissors consists of two levers and two wedges, and is usually held together by a screw which is another type of machine.

You will probably not be able to classify all the parts of every machine into the six groups of simple machines, for simple devices other than simple machines are used. Such devices as belts, chains, rods, and gears transmit force from one part to another. Springs and weights store energy temporarily. Brakes use friction to control force. Various kinds of shutters and valves open and close passageways. Wheels, rollers, and balls are used to reduce friction. There are good reasons for not including these various parts among the simple machines.

Scientists have discovered that the six types of simple machines help to do work in just three really different ways. In the first place, they may let a small force move through a long distance and change it into a very great force which moves something for a short distance. A hammer used in pulling a nail out of a board is an example of this. The hand, which alone could not pull the nail, may force the end of the hammer handle to move a distance of eighteen inches. The hammer head then exerts a very great force on the nail and draws it out about two inches. In the second application, a machine may do just the opposite by changing a great force which moves a short way into a much smaller one which moves something a long distance. The forearm acts as a simple lever on which the biceps muscle pulls with a force of about sixty pounds for a distance of two inches to lift a ten-pound weight in the hand as much as twelve inches. Acting in the third way, many simple machines change a force moving an object in one direction into a force which moves something in a different direction. See if you can think of some machines which do this. Some simple machines may even help in two ways at once, but they never act in all three ways at the same time. Can you see why?

Up to this point you may have thought that machines themselves save work. That, how-

ever, is a wrong idea. A locomotive is a great machine, but you may set it on a track and it will never move an inch of its own accord. It must have energy from fuel before it can move. Then it uses that energy to do the work of pulling a train. Likewise, a great printing press seems to be doing work of its own accord, but it is only using the energy of an electric current to do the work of printing and folding newspapers or magazines. You must, therefore, be careful not to confuse energy and machines. Machines themselves do not have energy and thus do not save work. They only help to make effective use of the energy from other sources which does save work.

Careful experimentation also shows that a machine does not make good use of all the energy or work that it receives. We may think of a crowbar as receiving work from a man's hand at the end of the longer arm and using it to lift a log on the short arm. Between the two arms, however, it must rest on something; a stone or another log may serve. At that point there will be friction, that is, resistance to motion. Some of the work done by the man's hand must be used to overcome this friction, and so cannot help lift the log on the other end of the lever. It is used up before it gets there. All machines have some friction, although it may be very slight. For that reason, there is no machine which can give back quite as much work or energy as is put into it.

Now you will want to read more about the different kinds of simple machines and look at pictures of them so that you will be able to recognize them and understand how they work. The Study Outline tells where to look for such articles and pictures in *THE WORLD BOOK*. It also tells where to look for pictures of some of the complicated machines. If you wish to find more, look up the ones named in the list following the article on *MACHINE*.

Study Outline

[Numbers refer to pages in *THE WORLD BOOK Encyclopedia*. Articles starred (*) are to be read in full.]

I. Work. See *FOOT-POUND**, 2529; *FORCE*, 2529-2530

1. What is work?
2. How does the scientist's definition of work differ from your previous idea of work?
3. How does one measure the amount of work done?
4. What is a foot-pound?
5. How much work does an elevator do in lifting a 150-pound man a distance of 65 feet?
6. How much work do you do in climbing 12 feet up a ladder?
7. A horse draws a loaded wagon with a force of 125 pounds a distance

of 3,500 feet. How much work does he do?

II. Types of Simple Machines.

A. The Lever. See *BALANCE*, 575; *LEVER**, 3950-3951; *MECHANICAL POWERS*, 4368-4369; *SAFETY VALVE*, 6295; *STEELYARD*, 6822-6823.

8. What is a lever?
9. Make a list of ten common levers.
10. What is the force arm of a lever? The weight arm?
11. If, in the use of a lever, the force moves much farther than the weight (or resistance), how do the force and weight compare?
12. If the weight or resistance moves farther than the force, how do the two compare?
13. How would you arrange a ten-foot bar to lift 90 pounds with a force of ten pounds? (That is, tell where you would place the fulcrum, and how long each arm would be, and why.)
14. Does a lever furnish any of the work required to overcome a resistance? Problem (2), 3951.
15. If the valve of the lever safety valve shown on page 6295 is three inches from the fulcrum, and the weight of 16 pounds is hung 21 inches from the fulcrum, how much force of steam will be required to open the valve?
16. The weight on the beam of the steelyard, page 6823, is 21 ounces, and it is one foot from the fulcrum. The large hook on which an object was hung to be weighed, is $3\frac{1}{2}$ inches from the fulcrum. How many pounds did the object weigh?

B. The Wheel and Axle. See *MECHANICAL POWERS*, 4368-4369; *WHEEL AND AXLE**, 7737-7738.

17. Compare the wheel and axle with a lever.
18. If, in Fig. 3, page 7737, the pail and water weighs 40 pounds, how hard would one need to pull on the other rope to lift the water? The radius of the axle is 5 inches and that of the wheel is 22 inches.
19. Make a list of ten wheels and axles which you can find in your home or in common use about you.

C. The Pulley. See *MECHANICAL POWERS*, 4368-4369; *PULLEY**, 5877-5878.

20. Why is a pulley a simple machine?
21. What are the two types of pulleys?

22. What advantage has the first type?
The second?
23. Why is it easier to lift an object with a movable pulley?
24. In the arrangement shown in Fig. 3, page 5877, how far will the hand need to move to lift the weight one foot?

D. The Inclined Plane. See **INCLINED PLANE***, 3373; **MECHANICAL POWERS**, 4368-4369.

25. Make a list of ten inclined planes in common use.
26. How does the distance one moves in pushing a weight up an inclined plane compare with the vertical distance the weight is lifted?
27. If a barrel which weighs 240 pounds is rolled up a board 12 feet long into a doorway 2 feet high, how much force would be required?
28. Is the incline of a toboggan slide used to gain force or distance? (Compare the length of the slide with the height of the upper end.)
5916

E. The Screw. See **MECHANICAL POWERS**, 4368-4369; **SCREW***, 6453-6454.

29. Explain why the screw is often considered an inclined plane.
30. What is the pitch of a screw?
31. Why is such a device as a jackscrew able to lift such a tremendous load?
32. List ten common uses of screws.

F. The Wedge. See **KNIFE (Illustration)**, 3804; **MECHANICAL POWERS**, 4368-4369; **WEDGE***, 7698.

33. Do you consider the wedge a true inclined plane or not? Why?
34. Why can the mechanical advantage of a wedge not be calculated by the use of a mathematical formula?
35. List ten types of wedges.

III. Combinations of Simple Machines. See **BLOCK AND TACKLE**, 795-796; **WEIGHING SCALE**, 7701-7702; Illustrations on pages 537-544, 626-627, 863, 1102, 1486, 1714, 1737, 1952, 2487, 2705, 2709, 2837, 2989, 3494-3496, 3884, 4033-4036, 4054, 4081, 4147, 4283, 4504-4505, 5821-5823, 6014-6019, 6112, 6513, 6519.

36. How does a block and tackle differ from a pulley?
37. What are blocks?
38. What is the tackle?
39. How much will a force of 20 pounds lift with the aid of a block and tackle having three movable pulleys?

40. How many levers are shown in the diagram of the weighing scales?
41. Choose a picture or diagram of a complicated machine which is of interest to you. See how many types of simple machines and how many examples of each type you can find.
42. How many different devices can you find which are used to connect simple machines together? Make a list of them.
43. State two advantages of combinations of machines over simple machines used alone.

IV. The Advantages Given by Simple Machines. See **GEARING (Illustration)**, 2709; **INCLINED PLANE**, 3373; **MECHANICAL POWERS**, 4368; **LEVER**, 3950-3951; **PULLEY**, 5877-5878; **SCREW**, 6453-6454; **WEDGE**, 7698; **WHEEL AND AXLE**, 7737-7738.

A. Mechanical Advantage.

44. What is meant by the mechanical advantage of a simple machine?
4368
45. How great is the mechanical advantage of a simple machine which uses a force of 50 pounds but overcomes a resistance of 300 pounds?
46. What is the mechanical advantage of a machine which uses a force of 150 pounds to overcome a resistance of 15 pounds? (The mechanical advantage may be less than one. It could be one-fifth, for instance.)

B. Increased Force.

47. When a machine uses a small force to overcome a great resistance, is the mechanical advantage more or less than one?
48. What is sacrificed to gain force?
3950, 3951
49. Give an example to show how each of the six simple machines is used to increase force.
50. Describe two cases where you know of a very small force being used to overcome a very great resistance.

C. Increased Distance.

51. Give an example of each of the following machines used to increase distance moved or speed: Lever, 3951; wheel and axle, 2709, 7738; inclined plane, 5916, 6633
52. A case of a screw used to increase speed is shown in the figure of the cream separator, page 1737. Can you tell how it works?

53. How does the mechanical advantage of a machine used to increase distance differ from that of a machine that is used to increase force?

D. Changed Direction of Action.

54. The lever and pulley are the simple machines most commonly used to change the direction in which a force acts. Find three examples of each.

V. Friction and Machines. See ENERGY, 2235; FRICTION*, 2622; HEAT [Where Heat Comes From (4)], 3111-3112; LEVER (Application), 3951; SCREW (Application), 6453; WEDGE, 7698; WHEEL AND AXLE, 7738.

55. What is friction? 2622
 56. When is friction an advantage to us? When is it a disadvantage? 2622
 57. Why is it necessary that all machines have some friction?
 58. In several places in the references given above, it is said that a certain thing will be true if friction be disregarded. Will the force required to overcome a certain resistance be greater or less if friction be taken into account? Will the mechanical advantage be more, or will it be less? 6453
 59. It is believed that energy cannot be destroyed, but its form may be changed. What becomes of the energy or work used up in overcoming friction in a machine? 3111-3112
 60. Considering your answers to the preceding questions, tell why the work put into a simple machine by the force must always be greater than the work it does in overcoming resistance.

Things to Do

1. With any straight stick and a one-pound weight, weigh a package. First balance the stick on a triangular block, or hang it up by a cord tied once around it at the balancing point. Then hang the weight on one side of the center, using a loose loop of cord and, in the same way, hang the package on the other side. Shift them back and forth until they are exactly balanced. Carefully measure the distances of the weight and the package from the point of support and work out the weight of the package by the plan explained on page 3951.

2. Get a friend who has studied machines to watch the erection of a new building with you

See which can get the longer list of simple machines used by the workmen.

3. Nearly every garage has a differential pulley for lifting the motors of cars. Get permission to examine one of these pulleys to see how it works. You might even be able to calculate what its mechanical advantage ought to be. See pages 795-796.

4. Have a contest to see who can write, in five minutes, the most names of different devices whose principle is the simple lever. The same kind of game can be played using names of devices which employ the other types of machines.

5. Measure a jackscrew, and calculate how much weight you could lift with it. See page 6453.

6. Which of the following ten statements are true, and which do you find to be untrue?

- Every part of any machine belongs to one of the six classes of simple machines.
- Machines are very useful to man because they help him do work.
- Savages used simple machines a great deal.
- If two unequal weights are balanced on a lever, the larger will be on the longer arm.
- Wheels and axles are much like levers in principle.
- Wedges and screws are really inclined planes.
- If the force acting on a machine moves a shorter distance than the resistance is moved, the resistance is less than the force.
- Friction increases the amount of resistance that a simple machine can overcome.
- If an automobile is stuck in the mud, it will require a smaller force to pull it out if a rope is run from the car through a pulley fastened to a post ahead of the car.
- Machines make energy.

7. Prepare a paper on one of the following topics:

- The Simple Machines That Are Used in My Home.
- The Simple Machines I Found in an Automobile.
- Ancient and Modern Uses of Simple Machines.
- How Machines Help Us.

Answers:

- | | |
|---------------|------------|
| 6. a. Untrue. | f. True. |
| b. True. | g. True. |
| c. True. | h. Untrue. |
| d. Untrue. | i. Untrue. |
| e. True. | j. Untrue. |

UNIT TWENTY

Harnessing the Energy of Nature to Do Man's Work

Main Understandings

1. Great streams and stores of energy exist in nature.
2. Man has learned to harness the energy of inanimate nature to the machines which do his work.
 - a. Windmills use the energy of the wind.
 - b. Waterwheels convert the energy of running and falling water into useful work.
 - c. Steam and gasoline engines harness the energy released from fuel by fire.
3. The work done by man's harnessed energy provides him with luxuries and leisure.

Putting Nature to Work for Us

A rich nobleman of old could enjoy many comforts and luxuries because he had all the slaves and servants he wanted. When he needed light, they brought candles or lamps; when it was hot, they fanned him; if he wished for jewels and robes from foreign lands, they brought them; if he wished to travel, they might even carry him; when he returned, tired and restless, they made soothing music, or amused him with strange tales. If you are an average American, you need not envy him, for you have the equivalent of countless slaves at your beck and call. The touch of your finger brings light far better than was ever dreamed of a hundred years ago, and currents of air more cooling than those from the fans of many slaves; you have heat or cold at your command; you have luxurious palaces to carry you hither and yon with magical smoothness and speed; magic music, too, comes at a touch, and all about you are books and magazines with stories of every kind; you have leisure for reading and study, while great schools and universities offer you the learning of the ages. All this luxury and opportunity, far beyond anything the rich nobleman of old could ever wish for, is yours because men have learned how to make nature do their bidding.

All about us there are supplies of energy whose limits we cannot comprehend. The sun sends to the earth hundreds of times more energy than will ever be needed or used. This radiant energy warms the earth; and the air, receiving heat from the earth, is set in motion, producing winds. The warmth also evaporates the water of the ocean and the moisture of the land. The vapor is carried to distant highlands, there to fall as rain or snow and run down the rivers to the sea. Both the wind and the running water have energy and can do work. The sunlight captured and stored by the green leaves of plants gives them, and animals, too, the means of living. The energy of sunlight ages-old lies deep in the earth in the coal and oil which were formed from the bodies of buried plants and animals.

For thousands of years men did not know what all the energy about them could do. At first they used only the work of their own muscles. Gradually they learned to use the

strength of animals by devising harness to make them carry burdens and draw plows and wagons. They learned to make the wind move their boats along and turn windmills to pump water and grind grain. They also learned to make the streams turn wheels for doing work.

Then for a long, long time they apparently made little progress in the use of nature's wealth of energy. In fact, however, they were laying the foundations for greater discoveries. They were learning how to make things of metal, and make them well. They were uncovering stores of iron ore, of coal, and oil. They were finding out that the heat set free from fuels by fire was energy, and that it could make things move.

Then, shortly before the Revolutionary War, a period of rapid progress in the use of nature's energy began. James Watt made a really successful steam engine. Other men invented cotton ginning and spinning and weaving machinery to be run by engines. Steam power was applied to boats and railways and to the driving of great hammers for forging machinery. All these made great changes in the life of the world, but not so great as were yet to come.

About sixty years ago, two other very important steps in power development were taken. One of these was the discovery of a way to harness the energy of fuel by burning it in the cylinder of an engine. Of course, only certain kinds of fuel were suitable for this use, but this invention made the automobile and airplane possible. The second important step was not really a new way to harness energy, but a new way to carry it from one place to another after it was harnessed. It was really a series of discoveries of how to generate and use electric current successfully. The energy of a great waterfall could be harnessed and turned into electric current. The current could be carried many miles to do work in a more convenient place. There arose a great demand for water-power to produce electric energy. Improved water wheels of metal were made larger and larger, until to-day a single wheel can produce over 50,000 horse power.

This great series of discoveries of ways to make nature run our machines and of better machines to do our work has made the difference between the rich nobleman and you. It is not a completed story, however. Inventors

and scientists are seeking for new ways to make energy do work. New kinds of steam and gasoline engines are being made. A great plant has been built in Cuba at a cost of more than a million dollars in an attempt to use the heat of the ocean for power. In other places, men are trying to drive airplanes and automobiles with rockets. Thus it may be that the work of the future will be done by a form of power quite different from any that we now know.

This story has not told you much about how modern power devices work, but you can find articles about windmills, waterwheels, engines, and many other interesting things in *THE WORLD BOOK*. The references to these are given in the Study Outline.

Study Outline

[Numbers refer to pages in *THE WORLD BOOK Encyclopedia*. Articles starred (*) are to be read in full.]

I. The Energy of Nature.

A. The Nature of Energy. See *ENERGY*, 2235.

1. What is energy?
2. What is the difference between potential and kinetic energy?
3. What is the source of most of the energy available to man?
4. Give three common instances of the transformation of energy.

B. The Wind. See *ENERGY*, 2235; *WIND*, 7789-7791.

5. Is the energy of wind kinetic or potential energy?
6. Where does the wind get its energy?

C. Running and Falling Water. See *NIAGARA* (The Falls and Whirlpool), 5010; *WATERFALLS*, 7666-7668; *WATER POWER* (The Water Power of the World), 7672.

7. How much water power is estimated to exist in the world? 7672
8. How many pounds of water go over Niagara Falls in a minute? How far does it fall?

D. Fuels. See *COAL* (Quantity of Coal), 1500-1503; *GASOLINE* (The Work It Can Perform), 2703; *PETROLEUM* (Distribution of Deposits, Nature and Location, Petroleum from Coal), 5522, 5529.

9. Why is coal called "buried sunshine"? 1497
10. How much coal is there believed to be in the world? 1503
11. At the present rate of consumption, how long will the world's coal supply last?
12. How much work can a gallon of gasoline do? 2703
13. What is believed to be the origin of petroleum? 5522

14. What do you think the world will do for gasoline when the oil supply gives out?

E. Sunlight. See *ENERGY*, 2235; *SOLAR ENGINE*, 6678; *SUN* (Composition and Heat of), 6920.

15. What fraction of all the energy of sunlight which strikes the earth would you suppose is not used in any way on the earth?

F. Heat. See *HEAT* (Where Heat Comes From [1], [5]), 3111, 3112-3113.

16. Why is heat important in power production?

II. Harnessing the Wind.

A. Windmills. See *WINDMILL*, 7791-7792.

17. Where are windmills commonly used?
18. Why does the wheel of a windmill turn?
19. Why is a vane necessary for the success of the common windmill?
20. How much power does an ordinary windmill develop?
21. What is the most recent development in windmills?

B. Sails. See *ICE YACHTING*, 3334-3335; *SAILBOAT AND SAILING**, 6301-6302; *SHIP* (Sailing), 6566-6567; *YACHT AND YACHTING*, 7918-7923.

22. How does a sailboat sail against the wind?
23. Why is tacking necessary when sailing into the wind?

III. Water Power. See *KEOKUK*, 3766, 3767; *MUSCLE SHOALS*, 4751-4752; *NIAGARA FALLS AND RIVER* (Water Power), 5013; *TURBINE WHEEL**, 7298-7299; *WATER POWER**, 7670-7674; *WATER WHEEL**, 7674-7676.

24. Which type of old-fashioned water wheel has been used most widely? 7676
25. Which type of wheel is shown in the picture on page 2255? What does it seem to have been used for?
26. What is the simplest type of turbine wheel? 7298
27. How does a water motor work? 7299
28. How is a turbine wheel different from the older wheels?
29. How do the guide blades of a turbine help to increase its efficiency? 7299
30. How much head do the turbines at Niagara have? 7299, 7671
31. Why is water power less expensive than other methods of operating machinery? 7670

32. What is meant by the cascade arrangement of water power plants? 6820
33. What two facts about a waterfall or dam must be considered in estimating the amount of power it can produce? 7670
34. What per cent of all the power of the water do most wheels use? What per cent do the very best wheels use? 7671
35. Where are "high-head" water power plants most common? 7671
36. What influences have encouraged the development of hydroelectric plants? 7672
37. What are the principal uses of hydroelectric power? 7672
38. Why do you think it is difficult to harness the energy of waves? 7674
39. How many lamps will a single generator at Keokuk light? 3766
40. How sensitive are the governors at Keokuk? 3766
41. How much power will the water wheels at Muscle Shoals develop? What will the power be used for? 4751
42. How is the water used for power at Niagara? 5013
43. Why may the power companies not take all the water they want from Niagara River?

IV. Power from Fuels. See ENGINE, 2236.

- A. Producing and Harnessing Steam. See BOILER*, 814-815; GOVERNOR*, 2883; LOCOMOTIVE, 4076-4082; RAILROAD, 5973-5984; SHIP, 6562-6570; STEAM*, 6817-6819; STEAM ENGINE*, 6819-6820; STEAM HAMMER*, 6820-6821; STEAM SHOVEL*, 6821; TURBINE (Steam), 7299.
44. What is the appearance of true steam? 6819
 45. What causes the pressure of steam? 6819
 46. What is superheated steam? 6819
 47. Why is a boiler a necessary part of a steam power plant?
 48. What are the important parts of a boiler? 814
 49. What is the difference between a fire-tube boiler and a water-tube boiler? 814
 50. What is the most important characteristic of a boiler? 814
 51. How is mercury vapor used for power? 815
 52. Trace the energy of a lump of coal to the piston of a steam engine. 6819

53. Did air pressure or steam do the work of the Newcomen engine? How? 6820
 54. How did Watt reduce the cost of operating the steam engine? 6820
 55. What was Watt's second important improvement of the steam engine? 6820
 56. Which way would the piston in the diagram on page 6819 be moving if steam were furnished to the engine? How do you know?
 57. When the piston reaches the end of the cylinder what changes will take place?
 58. How does the used steam get out?
 59. What is a compound engine? 6820
 60. How is a turbine different from the ordinary steam engine? 6820, 7299
 61. For what important uses are turbines employed? 6820
 62. How does a governor control the speed of an engine? 2883
 63. How closely can the force of a steam hammer be regulated? 6821
 64. What are the important parts of a locomotive? 4078
 65. What are the differences between fast passenger locomotives and those used to pull freight trains? 4078-4082
 66. How much power is used to drive the largest steamships? 6562
 67. What form of engine is used? 6565
- B. Internal Combustion Engines. See AIRCRAFT, 112-151; AUTOMOBILE, 534-536; CARBURATOR*, 1194-1195; DIESEL ENGINE*, 1944; GAS ENGINE*, 2700-2702; SHIP (Motor), 6566; TRACTION ENGINE, 7233.
68. Why is a gas engine called an internal combustion engine? 2700-2702
 69. What advantages does the internal combustion engine have for small power jobs? 2702
 70. When is liquid fuel better than gas for use in an internal combustion engine? 2702
 71. A collar or breast strap for the horse to push against is a very important part of a harness. What, in a gas engine, corresponds to the horse collar? 3048 (picture), 2701, 2702
 72. Give a connected account of what happens in the cylinder of a gas engine during two revolutions of the crank shaft. 2701, 2702
 73. How is too much fuel prevented from entering the carburetor? 1195

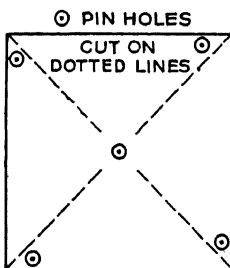
74. What makes the fluid flow through the nozzle of a carburetor? 1195
75. How much power has been developed by a single gas engine? 2702
76. What part does a flywheel play in the operation of a gas engine? 540-541
77. How does the clutch drive a car? Why is it necessary? 542
78. Give two uses of the differential. 542
79. In what ways are tractors better than horses for farm work? 7233
80. Why are spark plugs not needed on Diesel engines? 1944
81. How does the Diesel engine compare with the steam engine in efficiency?
82. What are the advantages of Diesel engines?

V. Measuring Power. See HORSE POWER, 3252-3253.

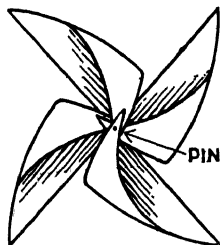
83. How was the size of a horse power decided upon? 3252
84. How much is one horse power? 3252
85. If an engine lifts 1,320 pounds 100 feet in a minute, how many horse power is it delivering?
86. Which method of determining the horse power of an engine gives the amount actually delivered? 3253

VI. How the Harnessed Energy of Nature Changes Our Lives. See AUTOMOBILE, 534-535; AIRCRAFT, 112-113; MACHINE, 4180; RAILROADS, 5973-5974; SHIP, 6562-6568

87. Choose what seems to you to be the most important influence of the development of water power, of steam power, and of gasoline power on your life. Tell why you choose each one.



Plan for Cutting Paper



Completed Pinwheel

A PAPER WINDMILL

Things to Do

1. Make a toy windmill. The diagram shows you how to do it. If you like to make models,

you can plan a working model of a wooden or metal windmill. Do not forget that it must be free to turn toward the wind.

2. Make an undershot water wheel. Use a cylindrical block of tough wood for the hub. Cut paddles of sheet iron or tin, and push them into knife cuts or narrow saw cuts in the hub. Two nails driven into the ends of the hub will serve as a shaft. Make a square wooden trough to fit your wheel. Set the trough on a slope, and let water from a faucet, hose, or pump run rapidly through it. If you live near a stream, you may be able to arrange it so the running water will turn it. Perhaps you can plan an overshot wheel and build a little dam to supply water to run it.

3. Make a collection of strange and unusual ways of harnessing energy. The following references will give you a start: BARKER'S MILL, 621; HYDRAULIC RAM, 3304-3305; ROCKET, 6155; SOLAR ENGINE, 6678. Look in science magazines in a public library or a school library for others. You will not find examples in every issue.

4. Read magazines of science and invention, to find the latest improvements of engines and water wheels.

5. Put an inch of water in the bottom of a test tube. Push a cork or rubber stopper lightly into the opening of the tube. Bend a strip of cardboard about the top for a holder. Hold the tube in a sloping position, with the top away from you, and heat the bottom until the water boils. If the steam does not leak past the stopper you will get results. Do not push the stopper in too tightly.

6. Fill in the missing parts of the steam engine shown in the diagram. Label the important parts.

7. Do you know your engines? To which kind of engine does each of the following belong:

- a. The name of its inventor?
- b. A "steam windmill"?
- c. Water-cooling system?
- d. One push for each two revolutions?
- e. One push for each revolution?
- f. Two pushes for each revolution?
- g. Four pushes for each revolution?
- h. Compression of 500 pounds to the square inch?
- i. Carburetor?
- j. Slide valve?
- k. Spark plug?
- l. Eccentric?
- m. Timing gears?

8. Prepare an interesting paper on one of the following topics. References for most of them will be found in the Study Outline.

- a. What Power Means to the World.
- b. The Sun as a Source of Energy.
- c. The Importance of Heat.
- d. Power from Water.
- e. The Work of Explosives. (See EXPLO-

SIVES, 2345, and list of references accompanying the article.)

- f. Transformations of Energy in Power Devices.
- g. The Work of Gasoline Engines.
- h. The Work of Steam Engines.

Answers:

- a. Diesel engine.
- b. Steam turbine.
- c. Any internal-combustion engine.
- d. One-cylinder, four-stroke cycle gas engine or Diesel.

- e. Two-cylinder, four-stroke cycle, or a one-cylinder two-stroke cycle gas engine.
- f. Steam engine, or four-cylinder four-stroke cycle, gas engine.
- g. Four-cylinder four-stroke cycle gas engine.
- h. Diesel engine.
- i. Gas (gasoline) engine.
- j. Steam engine.
- k. Gas engine.
- l. Steam engine.
- m. Gas engine.

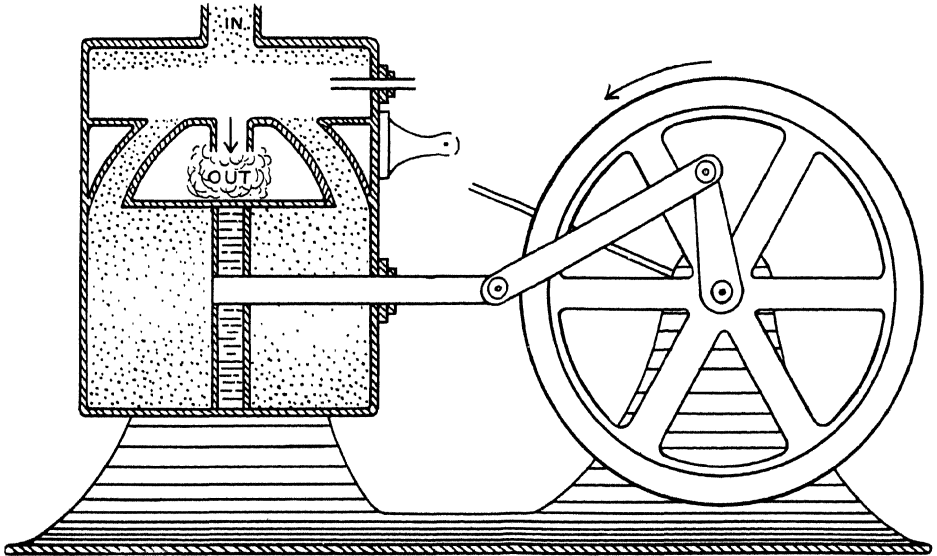


DIAGRAM OF A STEAM ENGINE

UNIT TWENTY-ONE

Generating and Using Electric Currents

Main Understandings

1. An electric current is a stream of electrons flowing through a circuit.
2. The electrons are commonly caused to flow through the circuit by chemical or magnet action (energy).
3. Electric currents have chemical, magnetic, and heat effects.
4. The electric current is a convenient method of transferring energy from one place to another.

Electricity at Work

Electricity is a magic servant, responsive to the slightest sound or the merest shimmer of light, yet quick as lightning and stronger than any giant. It carries the power of the distant waterfall into the heart of a city or throws the voice of man across the ocean. Almost unknown a hundred years ago, it has become our most useful helper.

Now that scientists have learned to control electricity and to make it work for us, they have come to believe that everything is made

of two kinds of very tiny electrical particles, *protons* and *electrons*. In some materials, such as copper or iron, there are electrons which can be got loose from their places and made to move along in a stream through the material. Such a material we call a *conductor*, and the stream of moving electrons is an *electric current*. When we wish to have an electric current move over a long distance, we provide a long, narrow path of conducting material, a wire, and surround it with some other kind of material, called an *insulator*, through which the electrons do not move easily. This will force

the stream of electrons to stay in its path. However, if the electrons are made to flow through such a path, there will soon be a

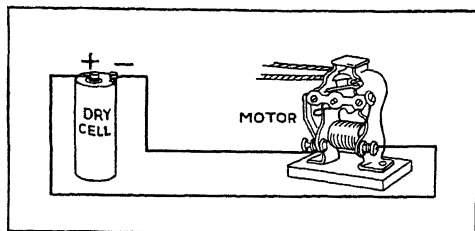


FIG. 1. A. SIMPLE ELECTRICAL CIRCUIT

scarcity of them at one end and an over-supply at the other. There will then be such

come back through the moist soil. This is done in some telephone and telegraph systems.

A simple circuit, to be of any use, includes something, such as a "dry cell," to make the electrons move; a wire to conduct them to the place where they are to do work; a motor, or other device, in which they can work; and a wire to bring them back again (Fig. 1). But suppose you want the moving electrons to do two kinds of work at once, how will you arrange your circuit? That is not so hard, for you can just have the electrons go through a motor and turn it, through a lamp and light it, and then return to the starting point (Fig. 2). This kind of an arrangement is a series circuit, because the electrons go through one thing after another in a series. To be sure, it will take more force to push them through, but

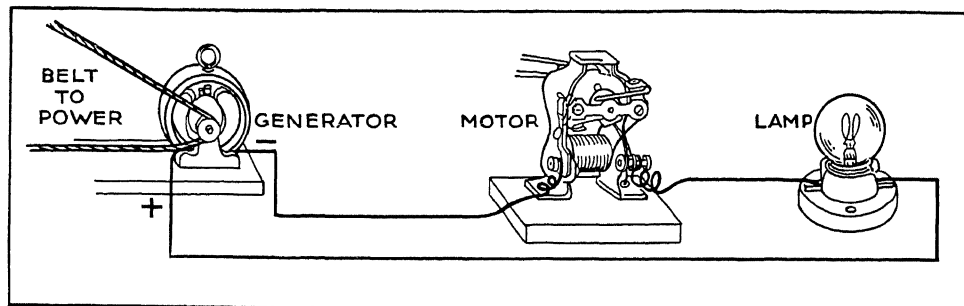


FIG. 2. A SERIES CIRCUIT

a high electrical pressure at the over-supplied end that we can not make any more electrons move, and the current will stop. When we use a current we must, therefore, have a return path as well as a going path, that is, there must be a complete circuit so that the electrons can

they are doing more work in operating two devices instead of one.

There is a second way to arrange for the current to do several things at once. You may divide it, and send part of the electrons through each division (Fig. 3). This arrange-

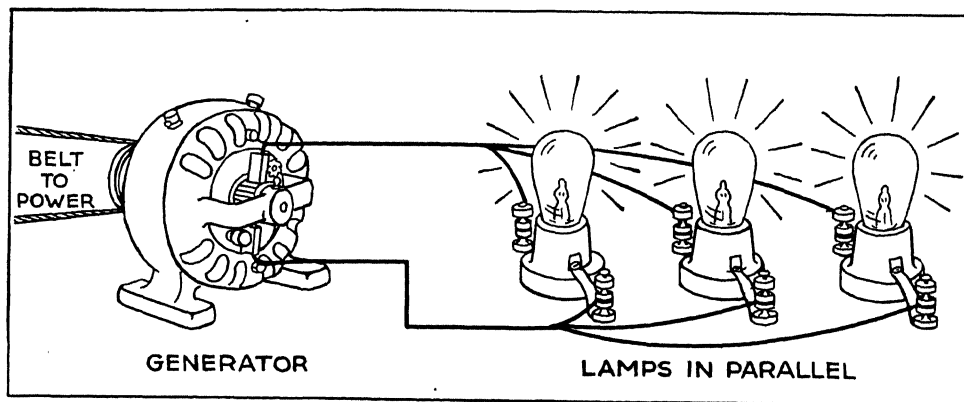


FIG. 3. DIVIDED OR PARALLEL CIRCUIT

go out to the place where they do work, and then come back to the place from which they started. We may make the entire circuit of insulated wire, or we may connect one end of the wire with the earth and let the electrons

ment makes a divided, multiple, or parallel circuit, and is used in all our house wiring. It takes more electrons to light three lamps than one, but the pressure does not have to be any greater.

There are series and parallel connections for batteries, too, but the same principles hold true. If all the electrons are made to go through all the cells, they will *gain* more pressure (Fig. 4), but if each cell alone forces some of the electrons around, there can be more of them, but the pressure will be lower.

You already know that there must be some kind of an electrical pump to make the electrons move in a current. Chemical action makes an electric current by which chemical energy is changed into electrical energy. Devices that do this are called *cells*, or more commonly, *batteries*. Magnets also produce elec-

can be readily used. It is, therefore, used to produce electric currents which carry the energy to cities hundreds of miles from the waterfalls and dams. The shipping of coal is very expensive and laborious, and to avoid this difficulty, the energy of the coal is often changed into electric current and sent over wires to run machines, pull trains, and light homes in distant places. The human voice can be heard only a few hundred feet, but its energy is changed into quiverings of electric current and sent half way round the world.

Many people find the study of electricity and electric experimentation a most absorbing

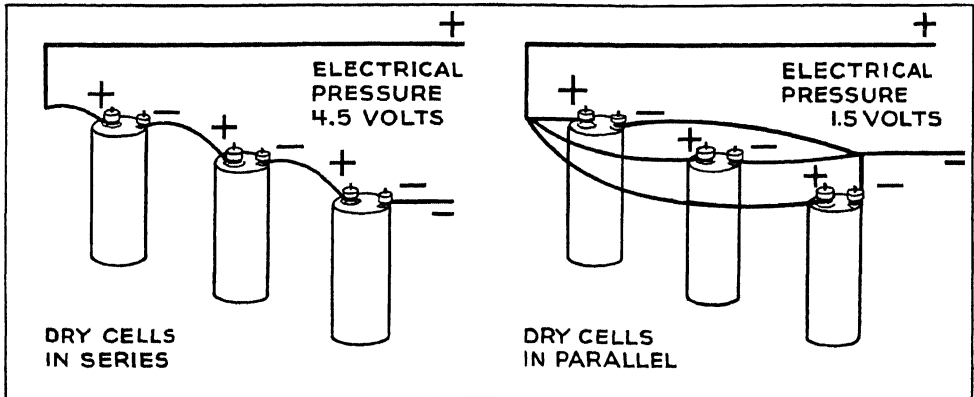


FIG. 4. CELLS CONNECTED IN SERIES AND IN PARALLEL

trical pressure in coils of wire which are moved past them. To produce current in this way, we have magnetos using permanent magnets, and generators using electromagnets. Some source of power, such as a water wheel or a steam engine, must be used to move either the coils of wire or the magnets. The work which it does is changed into electrical energy by the generators and sent out over wires.

Electrons do three kinds of work, and so we have three groups of devices for using electric currents. In passing through a wire, the movement of the electrons will heat it, and the wire will become very hot, if it strongly resists their passage. This heating effect is used in all such devices as electric lights, toasters, and irons. Moving electrons also cause chemical processes to take place in most solutions through which they are sent. Their chemical work is used to charge storage batteries, plate our silverware, and manufacture many kinds of chemicals. Finally, they may do mechanical work by means of the magnetic forces which they produce. As a result, we use electromagnets in all motors, electric bells, telephone and telegraph systems.

The greatest service of electric current to-day is that of carrying energy from one place to another. There is an abundance of water power, but it is not usually in places where it

pastime. If you are interested you can find many helpful articles in *THE WORLD BOOK*. These articles explain the telegraph and telephone, motors and generators, and the more recent radio and television. Use the Study Outline to guide your study.

Study Outline

[Numbers refer to pages in *THE WORLD BOOK Encyclopedia*. Articles starred (*) are to be read in full.]

I. Electric Currents.

A. **Their Nature.** See *CURRENT, ELECTRIC*, 1789; *ELECTRICITY* (Electricity in Motion, What Is Electricity?) 2174-2175, 2176

1. What is an electron? 2176
2. What is a proton? 2176
3. How heavy is an electron?
4. How heavy is a proton?
5. What is an electric current? 1789
6. What is meant by "generating an electric current"?
7. Why is it incorrect to apply the term electricity to a current of electrons?
8. Where do the electrons of an electric current come from? 2176

B. **Their Paths.** See *ELECTRICITY* (Conductors and Non-Conductors, What Is Electricity?), 2174, 2176; *ELEC-*

TRODE*, 2191-2192; ELECTROLYTE*, 2193; INSULATOR (Electric), 3468-3470; LIGHTNING (Explanation), 4001-4002.

9. Why can one charge a glass rod with electricity when it is held in the hand, but not a metal rod similarly held? 2174
10. Name five good conductors and five good insulators. 2174, 3468
11. When is water a good conductor and when not? 3470
12. Name a solution which is not an electrolyte. 2193
13. What makes a substance such as copper a good conductor? 2176
14. What makes a substance an insulator?
15. How is conduction in an electrolyte different from conduction in a metal? 2193
16. What is an electrode? 2191-2192
17. What happens when electrical pressure becomes too great to be held in by an insulator? 4001-4002
18. What is an electric circuit?
19. What is the difference between series connections and parallel connections in electric circuits?

C. **Their Direction.** See CURRENT, ELECTRIC (Direction of Current), 1790; DYNAMO (Applications), 2070; ELECTRICITY (Electricity in Motion, What Is Electricity?), 2174-2175, 2176.

20. Which way do electrons really move in a wire connected to a simple cell? 2174-2175, 2176
21. What is a direct current? 1790
22. What is a. e. c. current? 1790, 2070
23. Which kind of current is used most widely? Why? 2070

D. **Their Measurement.** See AMPERE*, 265-266; CURRENT, ELECTRIC (Production and Measurement), 1789; ELECTRIC METER, 2183-2184; GALVANOMETER*, 2670; KILOWATT*, 3775; OHM*, 5178; VOLT*, 7565; WATT*, 7681

24. What is an ampere? A volt?
25. How many volts are produced by a dry cell? 1789
26. What is a watt?
27. Which is larger—a kilowatt or a horse power? How much?
28. How many watts of power are used by a light drawing one ampere at 110 volts?
29. Suppose the first dial of a meter stood at 3, the second at 8, and the third at 3 when the first reading was taken. Two weeks later the dials stood at 3, 9, and 5, respectively. How many kilo-

watt hours had been used during the interval?

30. What is the use of a galvanometer?
31. How does a galvanometer differ from an ammeter?

II. Creating Electric Currents.

A. **By Chemical Action.** See CURRENT, ELECTRIC (Production and Measurement), 1789; ELECTRIC BATTERY*, 2168-2170; ELECTRICITY (Electricity in Motion), 2174-2175, STORAGE CELL, 6849-6850

32. What are the most important devices for causing electrons to flow? 1789
33. Who first produced a steady current of electricity? 2174
34. What parts are necessary to make a simple electric cell? 2174
35. How does the cell get the energy to make the current? 2175
36. Where are cells most useful as producers of current? 2175
37. Why are cells not practical for large currents? 2175
38. What are the sources of large currents?
39. Which of the plates in a simple cell really receives the larger number of electrons when there is not a complete circuit? 2168
40. What different materials may be used for the plates of a cell? 2168
41. What is polarization of a cell? 2169
42. Why does polarization reduce the current?
43. How is polarization prevented in a closed circuit cell? 2169
44. Why is a "dry cell" not really a dry cell? 2170
45. What does manganese dioxide do in a dry cell?
46. What changes take place when a storage cell is discharged?
47. In what form is the energy stored in a storage cell?
48. What are the two types of practical storage cells?
49. What voltage does each produce?
50. Make as long a list as you can of the uses of storage cells.

B. **By Magnetic Action.** See DYNAMO*, 2066-2070; ELECTRICITY (Electricity and Magnetism), 2175-2176; MAGNETO-ELECTRIC MACHINE*, 4219; WATER POWER (Hydroelectric Development, Uses of Hydroelectric Energy), 7671-7672.

51. Who first showed that magnetism could be used to produce electric current? 2175

52. Under what conditions does magnetism produce a current of electricity? 2175
53. How does a magneto generate an electric current? 2066, 4219
54. For what purposes are magnetos used? 2066, 4219
55. What two types of commercial generators are used? 2066
56. How is the energy for running a generator commonly provided? 2066
57. Why will apparatus diagrammed in Fig. 2, page 2067, produce an alternating current?
58. What is an alternator? 2067
59. What is a cycle in electric current? 2067
60. How many cycles are commonly produced per second for house lighting? 2067
61. Where is the current secured for the field magnets of an alternator? Of a d.c. generator? 2067, 2070
62. Why are generators so important in the development of water power?

C. By Heat. See THERMOELECTRICITY, 7144.

63. How can one produce electric current directly from heat?
64. How is this principle used?
65. How can one detect the heat from the body of a fly?

III. Use of Electric Current.

A. For Heating. See ELECTRIC HEATING, 2171; ELECTRIC LIGHT, 2178-2182; ELECTRIC WELDING, 2190; HEATING AND VENTILATION (Heating the Home by Electricity), 3117-3118.

66. What causes the production of heat by an electric current? 2171
67. Why does an electric light filament give more light than a toaster wire? 2171
68. How does the filament differ from the wire that brings the current to the bulb? 2171
69. Why is electric heating not commonly used for houses? 2171
70. Make a list of the common uses of electric heating.
71. Why is the air removed from an electric light bulb? 2178-2179
72. What advantages have tungsten filaments over carbon filaments? 7179
73. How does the economy of a nitrogen-filled lamp compare with the plain tungsten and carbon filament lamps? 2179

74. How does a mercury-vapor arc lamp work? 2181
75. What color is the light from a mercury-vapor lamp?
76. How is an ordinary arc lamp made? 2181
77. Why is it called an arc lamp? 2181
78. How hot is the crater of an arc lamp? 2181
79. How is a flame arc produced? 2181
80. What are the two methods of electric welding? 2190

B. Energizing for Magnets and Magnetic Devices. See AUTOMOBILE (Electric), 543; DYNAMO (Applications), 2070; ELECTRIC BELL*, 2170-2171; ELECTRIC MOTOR*, 2184-2187; ELECTRIC RAILWAY, 2187-2190; ELECTROMAGNET*, 2193; ELECTROMAGNETISM*, 2194-2195; INDUCTION COIL*, 3432; LOCOMOTIVE (Electric), 4882; TELEGRAPH, 7058-7066; TELEPHONE, 7067; TELETYPE, 7083-7084; TRANSFORMER, 7243.

81. How can one show that there is magnetic force around an electric current? 2194
82. What kind of a magnetic field is there about a magnet supplied with a c. current? 2195
83. What effect would this have on a compass needle?
84. How can one demagnetize a watch?
85. How is an electromagnet made? 2193
86. How does the electromagnet in a telephone receiver make sound waves?
87. Why does the clapper of an electric bell strike the bell once and stop? 2170
88. What is the purpose of the telegraph key? 7060
89. Why does a sounder make two clicks each time the telegraph key is pressed? 7060
90. What is the real difference between a dot and a dash? 7062
91. How are telegraphic messages sent to-day? 7059
92. What causes the suspended wire in Fig. 1, page 2164, to rotate?
93. Why does not the armature of a motor stop when it has moved as far as the magnets will pull it? 2186
94. What is counter electromotive force? What effect has it? 2186
95. What is a series motor? 2186-2187
96. How is the power for driving an electric automobile provided? 543
97. How does the current used by a

street car get back to the power house? 2188

98. How much more powerful than steam locomotives are the electric locomotives of the Chicago, Milwaukee, Saint Paul, and Pacific Railway? 2188

99. What per cent of the power used by electric locomotives is given back to the trolley in going down hill? 2188. How is this possible? 2066

100. How is the primary of an induction coil able to generate a higher voltage in the secondary than in the primary? 3432

101. What are the uses of an induction coil? 3432

102. How much wire has been wrapped on the secondary of a coil? 3432

103. How long a spark did this produce? 3432

104. Why are transformers needed in modern electrical transmission? 2070, 7243

105. How do they work?

106. How are the coils different in step-up and step-down transformers?

107. Is the picture on page 7243 that of a step-up or a step-down transformer?

C. For Producing Chemical Reactions.

See ELECTRO CHEMISTRY*, 2190-2191; ELECTROPLATING, 2195; ELECTROLYSIS, 2192-2193; ELECTROTYPING, 2196-2198; STORAGE BATTERY, 6849.

108. What effect has the current on the plates of a storage battery while it is being charged? 6849

109. How would you plate a knife with silver? 2195

110. Give an example of the injurious effects of electrolysis. 2193

111. Explain why electrolysis is a very valuable process in industry. 2190-2191, 2192-2193

Things to Do

1. Make a simple voltaic cell as described on page 2168. A simple way to test for a current is by tasting the electricity. Have the wires 12 to 18 inches long. Be sure that the free ends are quite clean. Holding them about a third of an inch apart with the fingers of one hand, touch the ends of both wires to the tongue. With the other hand lift the electrodes out of the electrolyte, taking care that they do not touch each other. Can you tell by the taste when there is a current and when not?

2. Try a variety of solutions such as vinegar, salt, soda, sugar, or plain water in your cell. Be sure to wash out the old solution thoroughly

when changing to a new one. Can you taste the current from all?

3. Make a cell from a lemon by cutting two slits in the rind and pushing your electrodes in.

4. Make an electromagnet as described in the unit on *Magnets* (Things to Do). Try your simple cells with it. By laying your electromagnet on the table in an east and west line and placing a compass needle a few inches from the end of it, you will have a crude galvanometer. A very slight current in the magnet will pull one end or the other of a needle toward it. The amount the needle turns and the end which points toward the magnet will indicate which kind of cell gives the most current, and whether it goes in the same direction all the time.

5. Make a storage cell, and use it as directed on page 6849.

6. Make a telegraph set according to the directions on pages 7060-7062.

7. Draw a diagram to show how you would connect a push button at your front door so that it would ring two bells at the same time, one upstairs and one down. If you have batteries and bells try your arrangement to see if it will work.

8. Draw a diagram to show how a button at the front door and one at the back would both ring the same bell. Try this out, too, if you can.

9. What outstanding discovery was made by the man whom each of the following terms honors:

- a. Ampere.
- b. Galvanism.
- c. Ohm.
- d. Volt.
- e. Watt.

10. Which of the following statements are right and which are wrong?

- a. Electrons really flow through a wire from the negative to the positive pole of a battery.
- b. Dry cells change electric energy into chemical energy.
- c. Electric motors are used as brakes on some trains.
- d. Electric power is measured in amperes.
- e. Direct current generators can be used in motors.
- f. Electrical pressure is measured in volts.

11. Learn to read your electric meter and check your home light bills.

12. Learn where and how to cut off the electric current in your home by opening the main switch near the meter.

13. Learn the location of the fuses which protect the wiring in your home. Learn how to replace them when they are "blown."

14. The following topics are suitable for oral or written reports:

- a. The men who made electricity our serv-

- ant. See the list of names on page 2178.
- b. Uses of electric current.
 - c. Electron pumps.
 - d. Batteries.

- e. Magnetism and electric currents.
- f. The most wonderful use of electric currents.
- g. Electrons and protons.
- h. Electric lights.

UNIT TWENTY-TWO

The Benefits of Light

Main Understandings

1. Light is a form of energy travelling at the rate of 186,300 miles per second.
2. This light energy is in the form of waves of different lengths, each length distinctive of some color.
3. Light coming from objects enables us to see them.
4. Light produces chemical effects which are used in photography and similar processes.
5. Light waves may be controlled for our better use by means of instruments such as telescopes, microscopes, spectacles, etc.
6. Light energy produces electrical effects which are utilized in the electrical transmission of images.

The Work of Waves of Light

We are turning our nights into days! Light is so necessary to our activities that we are extending the hours of light far into the night by artificial means. All during the hours of sunlight, travelling with the greatest speed known, countless trillions of little light waves are streaming straight to us across space from the sun millions of miles away. What would you do without them? A world without color! Even if you could see, this would probably be a very unattractive world. The reason we have color is because each tiny light wave represents a different color than a wave of any other length. When we have a complete assortment of all the lengths, then we have white light, such as the sun furnishes us.

Some people used to believe that there was a very mysterious force which went out from the human eye when a person gazed steadily at some object. To this mysterious force was attributed the power of the animal trainer to subdue wild beasts and to make them do his bidding. But lion tamers have several times come to disastrous ends when, in the act of putting their pets through stunts, suddenly the lights went out. Where, then, had gone the mysterious force?

It is only by means of the light waves reaching the eye that we are able to see things. Some things, like the sun or a candle flame, send us these waves directly, but most objects reflect the light to us second-hand. Sometimes the objects do not send to us the same full assortment of length of light waves which they receive, and then we do not get white light; so we say the object has color. An object can at best reflect only the light which it receives; therefore, if it does not receive all the colors, its color, as we see it, will depend on the light we are using. Most artificial lights do not send out waves of violet light, and consequently many things have a different color at night,

when we see them by electric light, than they do when we see them by sunlight.

Light waves are exceedingly wonderful artists. They paint pictures which are absolutely correct in every detail, and they do it all in a fraction of a second. But we must furnish the material for the light waves to work with. The waves enter the lens of a camera and paint the picture on the film. The film is coated with a chemical substance which is changed in proportion to the amount of light which falls upon it. We merely arrange the camera so that the light from the scene we wish to record will pass through the lens and fall upon the plate in exactly the same way that light from an object passes through the lens in the eye and paints a picture on the inside. There are ways of taking photographs in true colors, using the same chemical substances that are used for ordinary photographs.

By simply reversing the process of taking photographs by means of light, we can use light waves to project the original scene on a screen. This is made use of in the moving-picture industry. Pictures in their true colors can be shown on a screen, and by taking advantage of the speed of light and the slowness of our eyes, we can make the pictures seem to move. What would you do for entertainment if it were not for light? Light waves are even being used to record and reproduce sound waves. Many of our "talking pictures" are made through the recording of sound on the film by means of light waves.

We also make use of waves of light to prepare plates for printing pictures in newspapers, books, and magazines. The pictures reproduced in this way may be taken either from true photographs or from drawings. There are even engraving processes for reproducing paintings and photographs in all their original colors using different colored inks. These very intricate processes also use the energy of light waves.

By means of instruments which bend and sort and otherwise modify light waves, we are able to see things which formerly were entirely invisible to people. Telescopes enable us to distinguish objects which are millions and millions of miles away. Since the discovery of the telescope, we have found out that many of the planets have moons. Telescopes are being made larger and better all the time, so there is no possibility of knowing what wonderful sights are yet to be seen in the heavens. Microscopes have brought to view many thousands of living things which never before had been seen. By the use of these wonderful instruments, medical science has been able to pry into the habits of disease germs and to plan a campaign which has enabled us to gain some control over infectious disease, and perhaps scientists will eventually show us the way to stamp it out entirely.

If you were not able to hear, you could tell what people were saying by watching the movement of their lips. But what would be the benefit of light to you if you could not see? You have certainly learned that the production of all our food depends on the light which the green leaves of plants use to manufacture starch. Even our drinking water is made safe for use by the action of light waves in killing dangerous disease germs which might be lurking there, unseen to the naked eye.

And do you realize the benefits of invisible light?—light which cannot be seen! If it were not for such light, we couldn't even get sunburned. Special sources of light are used to produce artificial sunburn because of the health-producing activity of the invisible light waves on the skin. Even foods are being irradiated with these light waves in order to make them more healthful.

Follow the Study Outline and the references in *THE WORLD BOOK* if you want to know more about these wonderfully active, beneficial and almost unthinkable speedy little waves of light.

Study Outline

[Numbers refer to pages in *THE WORLD BOOK Encyclopedia*. Articles starred (*) are to be read in full.]

I. Physical Nature of Light. See *LIGHT**, 3993-3998; *NEWTON, SIR ISAAC*, 4960-4963; *ELECTROMAGNETIC THEORY OF LIGHT**, 2194; *MICHELSON, ALBERT A.*, 4456.

1. What kind of waves are light waves? 2194
2. At about what speed does light travel? 4456
3. What is the latest method for the determination of the speed of light? 4456
4. Who first made the discovery that

light was not instantaneously transmitted? 3721

5. How was this discovery made?
6. In what way are light waves related to heat waves, radio waves, and ultra-violet waves? 2194
7. How does a light wave differ in form from a water wave?
8. What is the "unsolved problem" concerning the theory of light propagation? 5903
9. It would take light four and a half years to come to us from the nearest star. How many miles away is that star?

II. How We See. See *EYE**, 2349-2353; *REFLECTION**, 6036; *MIRAGE**, 4529; *SENSES**, 6492.

10. What do you think of the possibility of training wild animals by means of the "force of sight" which comes from the human eye?
11. Why can't we always believe what we see? 2352
12. Why is it true that everybody is partly blind? 2353
13. How does the sense of sight compare in importance with the other human senses?
14. Why can't you see in the dark?
15. Why can't you see around the corner of a building?
16. It is said that when a person who has been blind from infancy suddenly receives his sight, the objects he sees seem to him to be right in the middle of his head. Can you explain this? 5484
17. See if you can discover why objects which you see do not seem to you to be in the middle of your head.
18. What is the difference in the way we are able to see a self-luminous object and one which is not self-luminous?
19. Explain why a mirage over the desert usually appears as a body of water? 4529
20. Since an image on the retina is inverted, why do not objects look upside down to us?

III. Cause of Color and Our Use of Color. See *COLOR**, 1550-1553; *DIFFRACTION**, 1945; *DRESS (Color Combinations)*, between 2034 and 2035; *RAINBOW**, 5986; *SPECTRUM ANALYSIS**, 6749.

21. What are the primary colors? 1552
22. Why is it unsatisfactory to try to match colors by ordinary artificial light?

23. What is the distinction between tint and shade? 1552
24. Why does the sun appear red when it sets?
25. If the sun is white at noontime on a clear day, what color do you think it would appear if you could ascend above the air and look at it?
26. Which color is on the outside band of a rainbow? 5986. Can you explain why this is true?
27. Under what conditions would it be possible for a rainbow to appear to be a complete circle? 5986
28. Why is it possible for the moon to cause a rainbow?
29. Why are bright colors which are complementary not very good color combinations for dress materials?
30. What element was discovered on the sun by means of the spectro-scope? 3131

IV. The Use Made of Lenses and Mirrors.

- See CAMERA*, 1107-1108; FIELD GLASS*, 2410; LENS, 3934; MIRROR*, 4531; MOVING PICTURES (The First Steps) 4704, (Moving Picture Apparatus), 4724-4725, 4728-4729; MICROSCOPE*, 4468-4469; SPECTROSCOPE*, 6749; TELESCOPE*, 7081-7083; SPECTACLES*, 6747-6749.
31. Why does a camera have to be focused in order to take a clear picture?
 32. Why is it true that you could not see a perfect mirror? 4531
 33. How could Archimedes have set fire to the Roman fleet by the use of mirrors? 4531
 34. What kind of mirrors could he have used?
 35. We are told that we are in total darkness half the time we are in a moving-picture theater viewing a picture. Why is this true? 4704
 36. In what ways has the use of the microscope revolutionized the science of medicine? 4469
 37. What objects cannot possibly be seen without the aid of a microscope?
 38. How is it possible for scientists to determine the composition, direction of motion, and rate of motion of a star by means of the spectro-scope? 6749
 39. What were the first heavenly bodies ever viewed through a telescope? 7081, 3721
 40. How was the principle of the telescope accidentally discovered?

41. Where is the largest refracting telescope in the world. 7083
42. What is the size of the mirror in the largest reflecting telescope?
43. How do bifocal spectacles aid one to see both distant and close objects? 6749
44. What style of lens is used in spectacles for nearsightedness? 6747
45. What was the use made of the camera obscura, which was the forerunner of our modern camera? 1109
46. What are some of the important industrial uses of the camera?

V. The Making of Pictures.

A. Photography. See PHOTOGRAPHY*, 5579-5584; DAGUERRETYPE*, 1805-1806; CAMERA*, 1107-1108.

47. To what man is credited the first practical photographic invention? 1805
48. Chemicals which are a compound of what metal are commonly associated with photography?
49. What is a "tintype"? 1806
50. What relation does the "tintype" bear to the daguerreotype?
51. What is a photographic "negative," and why so called?
52. What are the three steps which are ordinarily followed in the processes of photography? 5580
53. What is "mosaic" photography? 5582
54. How is it possible to take pictures in color? 5584
55. What is the "color filter" used in color photography?
56. To what extent is it possible to make moving pictures in natural color? 4722

B. The Making of Plates for Printing Pictures. See COLOR PRINTING, 5818-5819; HALF-TONE*, 3016-3017; PHOTO-ENGRAVING*, 5579; ROTO-GRAVURE*, 6214; ZINC ETCHING*, 7974.

57. The effect of light rays on what kind of substances is utilized in photo-engraving processes? 5579
58. For what kind of illustrations are zinc etchings used? 7974
59. What is the significance of the term "halftone"? 3016
60. In a halftone reproduction, about how many lines of dots are there to the inch?
61. How is it possible to reproduce the many colors of an original painting by the use of only three or four colors of ink? 5818-5819

62. What is the rotogravure process, and what is its distinct advantage over ordinary halftone work? 6214
 63. What two colors usually identify rotogravure work?
 64. Distinguish between relief and intaglio processes of reproducing pictures for magazine illustrations. 5579.
- C. Transmission of Pictures by Electricity.**
See TELEVISION*, 7084-7087
65. What portion of a picture is lighted at any one instant when the picture is being transmitted by electric means? 7085
 66. What is the source of light used at the receiving station for transforming electric impulses into light waves? 7086
 67. How is it possible to transmit a scene in its natural color by means of electric impulses?

Things to Do

1. Using the information given at the top of page 4457 and the bottom of page 6921, calculate the time that would be required for light to reach us from the sun.
2. Using one of the volumes of THE WORLD BOOK, examine the pictures carefully (using a small hand lens, if you care to) and see if you can distinguish between zinc etchings, or line cuts, and copper engravings, or halftones.
3. Look directly into a large mirror. Move your right arm and you will notice that the left arm of your reflection moves. Can you explain this? Now explain why the same reversing is not the case in the vertical relationship; that is, why isn't the reflection of your head where the reflection of your feet appears?
4. Astonish your friends with the appearing penny trick. With a bit of chewing gum, some wax, or other sticky material, fasten a penny to the bottom of a granite pan or a deep dish (a cup may be used). The position of the penny should be in the center of the pan and the pan should be so placed that the coin is just concealed from view by the side of the

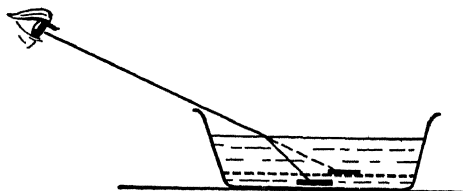


FIGURE FOR APPEARING PENNY TRICK

pan nearest the observer. When water is poured slowly into the pan, the penny will gradually come into view! The explanation of this phenomenon is shown in the diagram. As

the light rays from the penny emerge from the water into the air, they are refracted, or bent, and the penny appears to move out of its true position.

5. To show that light rays will actually bend around a corner to some extent, try the experiment with the ball-bearing (page 1945).

6. Make for yourself a microscope. The materials needed are a piece of glass, some oil or vaseline, and some water. Clean the glass thoroughly, and coat one side with the oil. When a drop of water is allowed to fall on the oil, it will assume a form having a convex surface, and if handled carefully, will magnify objects surprisingly.

7. Make for yourself a camera obscura similar to the one shown on page 1109. For a lens you can use a reading-glass. A mirror is placed in the position shown at the back of the box, and above the mirror is a piece of clear glass with thin drawing paper on it. In place of a lens, a thin opaque paper with a pinhole may be substituted.

8. Find the blind spot in your eye. On a white piece of paper make a large black spot a quarter to half an inch in diameter. About four inches to the left of this spot make a small cross. Hold the paper so that the cross will be in front of the left eye, and the spot in front of the right eye. Close the left eye, and look at the cross with the right eye. Look steadily at the cross, and move the paper slowly toward you from a distance of about eighteen inches. The black spot will entirely vanish when you find the right distance. The reason the spot cannot be seen at this position is because light from around that area of the paper is falling on the blind spot in your eye and you cannot see with that portion of the retina (see page 2353). The blind spot in the left eye may be discovered by turning the paper around and looking at the cross with the left eye while keeping the right eye closed.

9. To prove to yourself that half the time you are looking at a moving picture you are in total darkness, try this experiment the next time you go to a "movie." Move your hand rapidly before your eyes at a distance of about a foot. It will seem to move in short jerks, since you see it for a moment and then it is invisible; when you see it again it has moved.

10. To find out what colors are complements of others, try the following experiment: Select objects having a very clear distinctive color, such as a brilliant red book or a green book. Colored cards are ideal. Station yourself in front of a clear white wall. Look steadily for about a minute at the colored object, and then look steadily for the same length of time at the white background: An image of the object will gradually take form and will be in color which is complementary to the color of the object itself.



An Activity Program for School and Home

The subject of "character training" or "character education" has during recent years come to occupy a very important place in educational literature, and the need for it is acknowledged by practically all leaders in educational thought.

An investigation of state, city, and county courses of study shows that character education is quite generally required in American schools, but that very few of these courses provide adequate material for the use and guidance of the teacher. This investigation shows further that, although more than two score studies have been made in the field of character traits, there

is scarcely any literature available which is sufficiently specific and definite to be used in the home, where the subject of character education is of paramount importance. Through reference to the following pages, parents can supplement the work being done by the school or plan independently with their own children such activities as will readily suggest themselves.

This course of character training, using material in *THE WORLD BOOK Encyclopedia* as a basis, is therefore offered in the expectation that it will prove exceedingly valuable both for school and for home use.

I. The Objectives of Character Education

The objectives of character education necessarily determine the materials and the procedure. To assemble the best possible objectives, an examination was made of the extensive literature on scientific investigations in the fields of character traits and the activities in which citizens need to engage. The results were tabulated.

From the composite tabulation thus derived, the most important traits were chosen (based on degree of agreement among the studies); and from this list those were selected which in the judgment of the authors related closely to children's needs and experiences. The traits were then combined and classified in the list that is presented below. The list is organized on two levels, one somewhat more complex than the other. Each level might well constitute one or two years of training; thus the entire list might be used as a basic training, beginning with individuals who have sufficient intelligence to do independent reading. This will make the beginning at about the fourth grade, and the use of the list might continue in any grade even into junior high school. Children with a reading ability lower than

OBJECTIVES OF CHARACTER TRAINING

<i>Lower Level</i>	<i>Upper Level</i>
Steadfastness and Obedience	Honesty and Justice
Fair Play and Good Sportsmanship	Courage
Cleanliness	Thoroughness
Gratitude	Appreciation of Service
Self-Control	Initiative and Vision
Friendliness	Coöperation
Thrift	Ambition
Trustworthiness and Willingness to Serve	Loyalty and Patriotism
Kindness and Sympathy	Unselfishness and Generosity
Industry and Perseverance	Self-Reliance and Independence

fourth grade may work on the same traits, but will not be able to carry out the suggested supplementary readings.

Junior high-school grades will probably carry

on their character-training work in connection with their self-government plans or in home-room organizations. They may, however, utilize the same objectives and readings.

II. Some Problems Connected with the Programs of Character Training

The fact that the foregoing objectives are given in list form is not to be interpreted as implying that on the first month the teacher is to concern herself with steadfastness only, entirely disregarding situations which arise that show a need for thrift or friendliness. Neither should the list of objectives be interpreted to mean that at the end of the first month the teacher can abandon the trait of steadfastness, feeling that she has "taught" it and that it needs no further attention.

No character trait is unitary or general in its nature. For example, there is no general habit or attitude of honesty (as Hartshorne and May's studies show so plainly); there is one attitude of honesty in regard to copying from some one's else paper, another in regard to other people's money, another in regard to telling the age of children when traveling, and so on.

But if the teacher wishes to make the habit or attitude as general as possible, she will set the stage or condition the response so that children may be exposed to as many of the specialized honesty-situations as possible. Such procedure requires careful planning and time for execution. Moreover, specific attention must be given to the same sorts of situations often enough and repeatedly enough to allow for growth.

The recommendation is made, therefore, that the conscious thought of the group be directed for at least a month at a time toward each one of the listed objectives. During this

period the teacher will, of course, utilize for training purposes the important situations of the children as they arise, both those which refer to the particular objective toward which she is aiming, and any others that hold value for children.

Is character training, then, to appear on the program as a separate "subject"? Obviously, if such training is to function, it should permeate every period of the school day and of the child's out-of-school activities. A "character period" of twenty minutes is therefore an anomaly. The spirit of honesty, friendliness, independence, initiative, and so on should be manifest in every activity with which the school is connected.

Nevertheless, it is helpful to turn the attention of the group at intervals specifically to the consideration of certain traits and of problems connected with those traits. The occasions should probably be in connection with the children's group life as members of a "Citizenship Club" (or whatever name the children may select). The activity should probably not be labeled as "character training."

A suggested procedure for use at such club meetings of children in the elementary school follows. One objective is carried through a series of meetings for a month or two months. Only one meeting a week is necessary for specific consideration of problems, but the training should be continuous and it should be cumulative.

III. A Method of Procedure for Use in Developing Character Traits in Children of the Elementary School

The general method suggested for each trait consists of the following steps:

(1) The awakening in the child of interest in the trait; (2) finding the direct application of the trait to the children's own life-situations; (3) observing this trait as it abounds in the lives of the people of the community; (4) reading about a variety of situations in which this trait has been displayed; (5) practicing the trait assiduously in as many specific situations as may be possible (children are asked to list the possible situations, and choose for practice particularly those in which they feel themselves weak); (6) considering the problems that are likely to be encountered in attempting to live up to the ideal; (7) stating as a summary the resulting generalizations or conclusions.

Proposed Plan for the Meetings of the Citizenship Club

First Meeting.

1. *Introduce the trait to be considered for the month through a quotation or short poem on the board.*

Children discuss the meaning. Questions and directions: "Does this thought apply in any way to your own life? List the ways in which it does." (The teacher writes on the board as the children enumerate.)

2. *Recall of observed acts and the setting of problems.*
"Have you observed acts of others in which the same trait appeared?" (Make a second list of situations observed by the children.)

"Watch for acts of people in your community which show that they have this trait." (Post on the bulletin board the lists already given.) Ask each child to make an additional list of situations he has observed during the week.

"At the next meeting of our Citizenship Club, a week from to-day, we will hear your reports"

3. *Suggested Reading.*

"Here is a list of stories about people who have met the same kind of problems as those we have been discussing. Should you like to know what they did in each case?" (The books will be freely available to the children during their free-reading periods throughout the week.)

Second Meeting.

1. *Hear the reports of the observations.*

Compile one list from all the reports, and add it to the material on the bulletin board.

2. *Hear the reports of some of the stories.*

3. *Planning for practice.* During the last ten minutes of the meeting, children decide what are the most important ways in which they can practice this trait in their daily living. The bulletin-board lists will give assistance. Each child makes a copy of the full list, and decides which point he most needs to practice. He makes a copy of this point to take home to show his mother and father, and asks them to help him practice it during the week.

4. *Assignment:* "At our next meeting we will finish telling the stories read, and those children who wish to do so, may tell us about their experiences."

Third Meeting.

1. *Reports.*

Hear the reports of experiences of pupils in trying to carry out the activities they chose to practice.

2. *Checking lists and setting more problems.*

Directions: "Take out your complete list. Check those traits in which you think you have improved during the week; notice those in which you are still weak. Take home a copy of the complete list this week, and ask your mother and father to help you to remember to practice all the acts mentioned on it. If you experience any trouble or difficulty in carrying out these activities, make note of it, and bring your question to class next week, or to the teacher at any time, or put it in the question box.

3. *Hear the remainder of the stories.*

Fourth Meeting.

1. *Problem Solving.*

- Read the problems that have been presented.
- List all arguments on one side of each case
- List all arguments on the other side.
- Come to a conclusion as to what should be done.

2. Write the general conclusion in the form of a generalization.

IV. Specific Examples of the Working Out of Each Trait

LOWER LEVEL: UNIT ONE

Steadfastness and Obedience

1. **Awakening interest in the traits.**

Interest may be aroused through the story of "The Little Dutch Hero," page 6857; "Leonidas," page 3937, "Theodore Roosevelt: His Boyhood and Youth," page 6186, or the story of Edward W. Bok, page 816.

2. **Applying the trait to life-situations.**

The children make coöperatively a list of situations in which the traits steadfastness and obedience appear. A few examples of such situations follow:

- Arriving at school on time regularly.
- Working out a long, hard report for a class project.
- Practicing a music lesson.
- Keeping appointments with playmates, members of the family, or teachers.
- Obedying traffic regulations.
- Solving a hard problem in arithmetic.
- Keeping a garden free from weeds.

3. **Observing the traits in the lives of people in the community.**

The children report instances in which they have seen steadfastness and obedience displayed. Examples such as pupils may report are these:

- Mother getting dinner for the family, even though she is tired.
- Father working patiently on the job, day after day.

The postman delivering the mail, rain or shine.
The newsboy staying at his stand, in spite of cold and sleet.

The traffic officer always on duty, helping little children across the street.

Drivers stopping for traffic lights.

Firemen reporting promptly at a signal of fire, facing danger without wavering.

Stores, banks, schools opening promptly at stated hours.

4. **Reading about people who are steadfast and obedient.**

References below are to pages in THE WORLD BOOK Encyclopedia:

STEADFASTNESS	OBEDIENCE
Allen, Ethan, 224	Aaron, 2 (negative)
Atlas, 491	Alden, John, 195
Calhoun, John C., 1078-1079	Casabianca, 1225
Cato the Elder, 1248	Joan of Arc, 3677-3679
Daniel, 1820-1821	Leonidas, 3937
Evangeline, 2329-2332	
Huss, John, 3298	
Jackson, Thomas J., 3605-3606	
Jerome of Prague, 3657	
Jesus Christ, 3662-3671	
John the Baptist, 3691-3692	
Joshua, 3702	
Kossuth, Louis, 3814-3815	
Laurens, Henry, 3893	

Lee, Robert E., 3917-3921
Lincoln, Abraham, 4011-

4019
Montcalm, Louis J., 4619
Roosevelt, Theodore, 6185-

6190
Schurz, Carl, 6431
Story-Telling: A Little
Dutch Hero, 6857-6858
Thomas, George Henry,

7152-7153
Tyndale, William, 7337-7338
Verdun, 7493-7494
Washington, George, 7644-

7657
Winthrop, John, 7800

Quotations

Let us do our duty in our shop or our kitchen, or in the market, the street, the office, the school, the home, just as faithfully as if we stood in the front rank of some great battle and knew that victory for mankind depended on our courage, our strength, our will. When we do that, the humblest of us will be serving in that great army which battles for the welfare of the world.

—Theodore Parker.

This above all: to thine own self be true,
And it must follow, as the night the day,
Thou canst not then be false to any man.

—Shakespeare.

So nigh is grandeur to our dust,
So near is God to man,
When Duty whispers low, *Thou must*,
The youth replies, *I can*.

—Emerson.

Theirs not to reason why,
Theirs but to do and die.

—Tennyson.

LOWER LEVEL: UNIT TWO

Fair Play and Good Sportmanship

1. Arousing interest in the traits.

Interest may be aroused through a discussion of the Boy Scout Law. The Scout Law is presented in admirable detail in the article BOY SCOUTS OF AMERICA, page 913 of THE WORLD BOOK.

2. Applying the trait to life-situations.

The pupils make coöperatively a list of situations such as follows:

Playing games according to rules, preferring to lose a point rather than to break a rule.

Keeping one's promises or his agreements in a trade.

Keeping in the game in good spirits, even though losing.

Accepting no unfair advantage of an opponent in a contest, even though such an opportunity is open.

Carrying on class work faithfully in the absence of the teacher.

Obedience alone gives the right to command.
—Emerson.

5. Practicing the trait.

Children choose from the list suggested under (2) those points on which they think themselves weak. A pupil, if he wishes, may write down the points selected to show his parents, in order that they may help him with the practice.

6. Problems encountered in practicing steadfastness and obedience.

Children discuss their problems, and the teacher and the class try to help decide what should be done in the different cases. Problems such as the following may be presented:

Should I be required to study one hour every evening, whether I have assignments needing study or not?

Often I can't be on time for school without missing my breakfast. Which is better, to miss breakfast or be tardy?

Is it a good idea to have a set time to practice my music lesson? If I do, I often miss good times.

Why is it wrong to return to the classroom after school for materials which have been forgotten?

I am editor of the school paper; should I be required to put the paper out at a set time?

7. Generalizations.

People have confidence in those who are steadfast and reliable, and the confidence of others brings satisfaction.

By steady trying you reach the goal you set out to reach.

If distasteful tasks are promptly done, there is time for more pleasant occupations.

3. Observing the trait in the lives of the people in the community.

The children are asked to refer to their past experiences and then suggest instances in which they have seen fair play and good sportmanship displayed. Suggestions such as the following may be given:

A ball player refusing to claim a run, though no one else knew that he had not touched second base.

A losing ball team accepting the umpire's decision without complaint.

Clerks in a store working faithfully in the absence of the employer.

The driver of an auto dimming his lights on approaching a car traveling in the opposite direction.

A camp leader refusing to accept for himself any easier conditions that will add to his comfort or convenience than he can give the other members of the camp.

4. Reading about others who have practiced fair play and good sportsmanship.

References below are to pages in THE WORLD BOOK Encyclopedia:

Arbitration, 344
 Arbutus, 346
 Baden-Powell, 570
 Beard, Daniel C., 663-664
 Boy Scouts of America, 909-914
 Burke, Edmund, 1028
 Camping: Camp Discipline, 1112
 Camp Fire Girls, 1114-1115
 Catt, Carrie Chapman, 1249-1250
 Debate, 1851-1853
 Games and Play, 2674-2679
 Girl Scouts, 2814-2817
 Golden Rule, 2862
 Hart, Albert B., 3063
 Income Tax, 3374
 Massasoit, 4336
 May, 4351
 Mitchell, John, 4561
 Nelson, Horatio, 4875
 Norway: Travel in Norway, 5084
 Olympian Games, 5196-5197
 Patent, 5412-5414
 Penn, William, 5461
 Consolidated Schools, 6423-6424
 Scott, Sir Walter: Struggle against Financial Difficulties, 6450-6451
 Seton, Ernest Thompson, 6506

William I, Prince of Orange, 7771
 Williams, Roger, 7772-7773
 Woman Suffrage, 7822-7825
 Wrestling, 7895-7896

5. Practicing the trait.

Children choose from the full list suggested under (2) those points on which they find themselves weak. If they wish to do so, they ask parents and teachers to help them remember to practice the acts they select.

6. Problems encountered in living up to the ideal.

The children discuss their problems, and the teacher and the class try to help them decide what they should do in such cases. Examples of problems children may report follow:

If the umpire in a game renders an unjust decision against you, what should you do?

If you overhear a conversation which gives you information which you should not have, what should you do?

In a game of croquet you accidentally touch your ball and it rolls into a position with an advantage to you; no one saw the accident. What should you do about it?

7. Generalizations.

Self-respect is worth more than high scores in the game.

Playing the game according to the rules brings a feeling of pride and satisfaction.

LOWER LEVEL: UNIT THREE

Cleanliness

1. Awakening interest in the trait.

Interest may be aroused by health posters such as are available in generous quantity and in a variety of appropriate subjects from the United States government and state and city boards of health, but especially by subject matter in THE WORLD BOOK which will be found particularly appropriate on topics pertaining to cleanliness of the person and of surroundings. Reference is made to some of these subjects in (4), appearing later on this page.

2. Applying the trait to life-situations.

Children make coöperatively a list of situations, such as—

Bathing frequently.
 Brushing teeth after each meal.
 Washing hands before eating.
 Keeping finger nails clean.
 Shampooing the hair frequently.
 Wearing clean clothing.
 Keeping rooms free from dust.
 Keeping toilet rooms clean, toilets flushed, bowls scrubbed.

3. Observing the trait in the lives of people in the community.

Children report instances in which they have seen cleanliness displayed, such as—

Fresh, clean clothes hanging on the line.
 Scrubbing floors of public rooms.
 Hauling away the garbage from closed cans.
 Burning trash from alleys.
 Sprinkling the streets.
 Washing windows.
 Putting screens to windows and doors.
 Cleaning carpets, rugs, furniture.
 Scalding dishes.

4. Reading and reporting about cleanliness.

References below are to pages in THE WORLD BOOK Encyclopedia:

Acne, 22
 Baby: Cleanliness, 555
 Baths and Bathing, 648-651
 Bedbug, 670
 Cleaning Processes, 1460-1461
 Fly: Preventive Methods, 2499-2500
 Hygiene: Personal Hygiene, 3312-3313
 Itch, 3588-3589

Life Extension: Keep the Teeth, Gums, and Tongue Clean, 3989-3990
 Panama Canal: Sanitary Triumphs, 5332
 Philippine Islands: Sanitation, 5561
 Sewage and Sewerage, 6511
 Skin: Care of the Skin, 6634
 Teeth: Care of the Teeth, 7054
 Typhoid Fever: Prevention, 7340
 Vacuum Cleaner, 7440
 Waterworks, 7676
 Wounds: First Aid to the Injured, 7893

Quotations

Cleanness of body was ever esteemed to proceed from a due reverence to God, to society, and to ourselves. —*Bacon*.

Cleanliness is indeed next to godliness. —*Wesley*.

5. Practicing the trait.

Children choose from the list which they made under (2) the points in the practice of

which they find themselves careless. They begin to apply the practices suggested. If they wish to do so, they enlist the help of parents and teachers.

6. Problems encountered in living up to the trait.

Children discuss their problems and seek help in finding solutions to such questions as these:

One of our neighbors throws garbage in the alley back of our house. What can we do about it? Should I eat in a restaurant in which there are flies? Should we buy the bread from a merchant who keeps unwrapped bread on an open counter?

7. Generalizations.

Cleanliness is essential to good health.

A clean person is more attractive than an unclean one.

One can be proud of living in a clean community.

LOWER LEVEL: UNIT FOUR

Gratitude

1. Awakening interest in the trait.

Interest may be awakened through the use of quotations, or through the poem, "Thanksgiving," by Ellen I. Tupper, page 7135. Interest may be more easily aroused if the study of this trait is presented at Thanksgiving time.

2. Applying the trait to life-situations.

Children make coöperatively a list of situations in which the trait appears. The list may contain such situations as the following:

Reading poems or stories and singing songs to express gratitude for blessings received.

Showing kindness to the unfortunate.

Caring for the things in nature which contribute to our comfort and happiness—the grasses, the trees, the flowers, the birds.

Expressing thanks by words and actions to parents, relatives, and friends for their love and thoughtfulness.

Refraining from acts which will hurt those to whom we owe gratitude.

3. Observing acts of gratitude in the lives of people in the community.

Children suggest a list of instances in which gratitude has been observed. Examples from such a list follow:

A man caring for an aged parent.

People protecting trees and flowers,

A family caring for a dog that is no longer useful, because of his past usefulness.

A woman repaying a friend's kindness.

People attending services in the community at which gratitude for blessings is expressed.

The community erecting monuments to the memory of public servants or heroes who have died.

4. Reading and discussing examples of gratitude.

References below are to pages in *THE WORLD Book Encyclopedia*:

Absalom, 10 (negative)

May: Special Days, 4354

Passion Play, 5408-5411

Pension, 5475-5476

Riley, James W., 6127-6129

Singing Tower, 6619-6621

Soldiers' Bonus, 6670

Soldiers' Homes, 6680

Spanish-American War: Maine Memorial, 6740

Thanksgiving Day, 7135

Unknown Soldier, 7417

Valley Forge, 7445

Veterans' Bureau, 7512, 7514

Victoria Cross, 7522

Washington Monument, 7657

Whitlock, Brand, 7752

Willard, Frances E., 7766-7767

Quotations

A thankful heart is not only the greatest virtue, but the parent of all the other virtues.

—*Cicero*.

Gratitude is the fairest blossom that springs from the soul.

—*Ballou*.

It is very nice to think

The world is full of meat and drink,

With little children saying grace

In every Christian kind of place.

—*Stevenson*.

5. Practicing the trait.

Children are asked to choose from the list suggested under (2) points in which they find

themselves weak, and begin expressing their gratitude as they see opportunities.

6. Problems encountered in living up to the ideal.

Children present problems they have encountered and ask the teacher and the class for help in finding solutions.

Ingratitude is shown in our town by careless picking of wild flowers, by defacing public buildings, by cutting souvenirs from monuments. What can we do about such action?

7. Generalizations.

The world is a better place in which to live because of the gratitude of man.

LOWER LEVEL: UNIT FIVE

Self-Control

1. Arousing interest in the trait.

Interest may be aroused through the quotation, "Careful with Words," by Carleton, page 1199.

2. Applying the trait to life-situations.

Children suggest a list of situations in which self-control is practiced, such as—

- Keeping back angry words when provoked.
- Refusing to strike one who struck you.
- Speaking the truth, even though it causes you discomfort.
- Refraining from repeating reports that will harm others.
- Keeping your head in an emergency—calling the doctor and giving first-aid treatment.

3. Observing self-control in the lives of people in the community.

Children suggest instances in which they have seen people showing self-control, such as these:

- A clerk remaining calm in spite of the angry statements of a customer.
- A man speaking kindly of a neighbor who had abused him.
- A telephone operator in a burning building staying at her switchboard long enough to warn everyone in the building.
- A driver acting quickly to save the life of a child who ran in front of his car.
- A man refusing to make an attractive-looking investment until he carefully investigated the facts concerning the enterprise.

4. Reading about others who practice self-control.

References below are to pages in *THE WORLD BOOK Encyclopedia*:

- Achilles, 20 (negative)
- Antony, 313-314 (negative)
- Athletics: Training, 484-485
- Brahmanism, 917
- Buddhism, 999-1000
- Bunyan, John, 1022-1024
- Cynic School of Philosophy, 1798
- Diogenes, 1953
- Fasts and Fasting, 2376

- Galahad, Sir, 2659-2660
- Gandhi Mohandas, 2679-2680
- Gough, John B., 2879
- Holy Grail, 3201-3203
- Jujitsu, 3708
- Lindbergh, Charles A., 4025-4030
- Nursery Schools, 5118

Prison Reforms, 5826-5827.
Theodore Roosevelt: His Boyhood and Youth, 6186

- Sparta: Training the Spartan Boy, 6743-6744
- Taft, William Howard: In the Cabinet, 7000
- Willard, Frances E., 7766-7767
- Woman's Christian Temperance Union, 7822

REFERENCES FOR PARENTS AND TEACHERS

- Anger in Childhood, 282
- Corporal Punishment, 1696

5. Practicing the trait.

From the list of situations made by the pupils under (2), children choose points upon which they are weak and begin to practice upon them. The interests of both parents and teachers may be enlisted to give assurance that opportunities for practice are not neglected.

6. Problems encountered in living up to the ideal.

Children seek the aid of the teacher and the group on problems, such as the following:

- If you don't fight back when a boy hits you, the other boys call you a coward.
- Why does being frightened make me forget how to swim?
- You are told in confidence something which would help a friend of yours. Should you tell him?

7. Generalizations.

One who possesses self-control can command circumstances; one who lacks it is commanded by them.

Self-control is gained only by constant practice.

Losing control of yourself makes you unhappy afterwards.

LOWER LEVEL: UNIT SIX

Friendliness

1. Arousing interest in the trait.

Emerson said, "The only way to have a friend is to be one." This quotation invites discussion by the pupils. Is Emerson right? How can one be a friend? The story of "Damon and Pythias," page 1816, may arouse interest in friendliness.

2. Applying the trait to life-situations.

Children make a list of situations in which friendliness is shown. A few are given below:

Planning a pleasant evening for people you like.
Sending books or flowers to a member of the class who is sick.

Protecting a younger child from danger.

Sharing your toys or books with others.

Helping a strange pupil to get acquainted in the school.

Being cheerful and pleasant to those with whom you live and work.

Exchanging letters, pictures, and products with pupils of other lands.

3. Observing friendliness in the lives of people in the community.

Children make a list of examples of friendliness which they have observed. The list may contain the following instances:

Picnics at which all members of the community join in having a good time.

A man building a bird bath in his yard.

A neighbor helping to nurse a sick child.

Making calls upon friends or to welcome newcomers in a community.

Clubs entertaining speakers from a foreign country.

4. Reading about friendliness.

References below are to pages in THE WORLD BOOK Encyclopedia:

FRIENDLINESS WITH OTHERS

Auld Lang Syne, 504

Boswell, James, 880

Courtship of Miles Standish, 1724-1726

Damon and Pythias, 1816

David: David and Jonathan, 1835

Hallam, Henry, 3020

Howells, William D., 3267-3268

Johnson, Samuel, 3689-3690

Lamb, Charles, 3846-3847

Ohio: Agriculture (Johnny Appleseed), 5170

Rhinoceros Bird, 6090

Saint Bernard, Great, 6303

Schumann-Heink: Gift to Soldiers, 6430

FRIENDLINESS WITH OTHER NATIONS

Alabama: Alabama Claims, 164

Alaska: Boundary Dispute, 175-176

Argentina: Christ of the Andes, 377

Armaments, Limitation of, 406-407

Bering Sea Controversy, 713

Carnegie, Andrew, 1202-1203

Carnegie Endowment for International Peace, 1203

Liberty, Statue of, 3963-3965

Morrow, Dwight W., 4663-4664

Norway: Travel in Norway, 5084

Olympian Games, 5196-5197

Pan-American Union, 5339

Rhodes Scholarships, 6099

Roosevelt, Theodore: Exploring Again, 6194

Saint Valentine, 7441

Vancouver: An International Memorial, 7455

Wordsworth, William, 7845-7847

FRIENDLINESS WITH OTHER RACES

Eliot, John, 2209

Massasoit, 4336

Penn, William, 5460-5462

Pocahontas, 5677-5678

Rosenwald, Julius: The Rosenwald Fund, 6206

Thanksgiving Day: The First in the New World, 7135

Xavier, Saint Francis, 7915

REFERENCES FOR PARENTS AND TEACHERS

Suggestions for Valentine Observance, 7442

Quotations

Life is to be fortified by many friendships.

—*Sidney Smith.*

The only way to have a friend is to be one

—*Emerson.*

5. Practicing the trait.

Children choose from the full list of situations which they list under (2) the points on which they feel weak. They plan to practice being friendly in such ways during the week. If they desire to do so, they may enlist the help of their mothers and fathers in their practice.

6. Problems encountered in being friendly.

Children discuss their problems, and the teacher and the group try to decide how to solve such problems as the following:

You help a little child across the street, and the other boys laugh at you.

You find a stray dog on the street; you help it find its home, only to be accused of trying to steal the dog.

You speak pleasantly to an acquaintance on the street, but get a gruff answer.

Should you chum with a boy who has habits you do not like?

Should you continue being friendly to a person who is unfriendly to you? To one who is unfriendly but makes no effort to be friendly?

7. Generalizations.

The world is a happier place if people are friendly.

People are usually friendlier to you if you are friendly to them.

LOWER LEVEL: UNIT SEVEN

Thrift

1. Awakening interest in thrift.

See the quotation given below, or find the Boy Scout Code on thrift in the Boy Scout Manual or in the Scout Law, on page 913 in THE WORLD BOOK.

2. Applying the trait to life-situations.

Children make coöperatively a list of situations such as those listed below:

Keeping personal accounts, and saving something regularly.

Working steadily on your tasks, so that no time is wasted.

Going to bed early enough to get the proper rest, in order to save energy.

Keeping clothes clean and mended.

Doing work thoroughly, so that it will not need to be done over again.

Considering the cost of articles purchased, and buying the ones that will last the longest and give the most pleasure or service to all persons concerned.

3. Observing thrift in the lives of people in the community.

Children report instances such as the following, in which they have seen thrift displayed:

A family making a budget and living so that some money is saved each month.

A family planning its vacation and considering how to get the most enjoyment for all members on the money they have to spend.

A student concentrating upon his work, in spite of noise around him.

A housekeeper planning her meals to use leftovers in dishes the family will like.

Planting new trees in a forest as old ones are cut down.

4. Reading and reporting on thrift in the lives of others.

References below are to pages in THE WORLD BOOK Encyclopedia:

SAVING MONEY

Banks and Banking: Savings Banks, 610, 613

Budget, 1000-1001

Christmas Carol, 1417 (negative)

Franklin, Benjamin, 2593-2597

Old Age Pensions, 5189-5190

Poor Richard's Almanac, 5730

Good-Roads Movement, 6142 (wise spending)

The Ant and the Grasshopper, 6860

Thrift, 7160

Woolworth, Frank W., 7844

SAVING NATURAL RESOURCES

Agriculture: Other Lands, 101

Arbor Day, 344-346

Arbutus, 346

Canning Clubs, 1172-1173

Conservation, 1622-1623

Forests and Forestry: Destroyers of the Forests, 2534-2541

Irrigation, 3553-3559

Izaak Walton League, 3594

Lumber: Utilizing Waste, 4150, 4152

Meat and Meat Packing: Products and By-Products, 4365

Michigan: Forests, Fisheries, 4461-4462

Minnesota: Forests, Agriculture, Game and Fish, 4518

New Hampshire: Forests, 4921

New Jersey: Forests, 4929-4930

New York: Forests, 4972

North Carolina: Forests, 5058

Norway: Forests, 5086

Paper Conservation, 5351

Parks, National, 5383

Reclamation, 6022

Seal: Fur-Seal Legislation, 6468

Texas: Irrigation, Forests, 7124

United States of America: Forest Resources, 7369

Irrigation and Dry Farming, 7374

Utah: Agriculture and Irrigation, 7430

Virginia: Wild Life, 7541

West Virginia: Forests, 7720

Wisconsin: Forests, 7806-7807

Yellowstone National Park, 7935

REFERENCES FOR PARENTS AND TEACHERS

Home Economics, 3205-3210

Thrift, 7160

Quotation

Remember that time is money.—*Franklin*.

5. Practicing the trait.

Children choose points on thrift on which they know they are weak and begin to practice being thrifty. (See list made by children under (2) above.)

6. Problems encountered in living up to the ideal.

Children discuss problems which they have encountered or noticed others encountering, such as the following:

The nurse says we should have the dentist look over the teeth once every six months. If your

teeth are in good condition, why spend that money?

Suppose you find that the budget you have made doesn't allow enough for your expenses. There is a temptation to spend some of your savings. Should you do this?

I budgeted my time for a week, but other people bothered me so many times that I couldn't keep my schedule.

7. Generalizations.

Thrift brings happiness and success; extravagance and waste lead to want.

Thrift is more than saving; it is spending wisely.

One should be thrifty in regard to time, energy, and health, as well as thrifty in regard to money.

LOWER LEVEL: UNIT EIGHT

Trustworthiness and Willingness to Serve

1. Awakening interest in the traits.

Interest may be aroused through the quotation from the Bible, "He that would be first among you let him be the servant of all." Children may name examples of characters that have been honored because of their faithful service. Read "Incident of the French Camp," page 6011.

2. Applying the traits to life-situations.

Children make a list of situations in which the traits appear. The list may contain situations such as these:

Doing well a task which you are trusted to do without inspection.

Accepting an office in your club and performing your duties promptly and well.

Accepting responsibility for certain home duties and performing them faithfully, not waiting to be reminded of them by others.

Protecting younger children from harm.

Helping to keep the city streets clean.

Selling Red Cross seals, and promptly turning in the report of sales and the sum collected.

3. Observing the traits in the lives of people in the community.

Children suggest instances like the following, in which they have seen the traits displayed:

Town officers and school-board members serving the community without pay.

Women of a church holding dinners, fairs, and similar enterprises to earn money to support the church.

Firemen risking their lives to save others.

Life-saving crews who face great danger that others may be safe.

Scout leaders and other club advisers who give time and energy to making the lives of others happy.

Nurses and doctors who work long hours to save lives.

4. Reading about people who have served willingly and faithfully.

References below are to pages in THE WORLD BOOK Encyclopedia:

WILLINGNESS TO SERVE IN WAR

Barry, John, 630-631

Barton, Clara, 632

Crusades, 1761

Lee, Richard Henry, 3917

Nightingale, Florence, 5026-5027

Red Cross, 6026-6030

Ross, Betsy, 6208

WILLINGNESS TO SERVE IN PEACE

American Association of University Women, 247-248

Benton, Thomas H., 710

Bible Society, American, 732

Booth Family, 860-861

Cartwright, Peter, 1223

Civitan Clubs, 1452

Deaf and Dumb: Education, 1847-1849

Gorrie, John F., 2877

Hadley, Arthur T., 3000

Hale, Edward Everett, 3015-3016

Hampton Normal and Agricultural Institute, 3030

Hoover, Herbert C., 3226-3235

Hull House, 3280

Jay, John, 3644

Koch, Robert, 3811

Lathrop, Julia, 3885

Pasteur, Louis, 5411-5412

Pestalozzi, 5513-5514

Red Cross: Junior Red Cross, 6030-6031

Reindeer, 6047

Rhodes Scholarships, 6099

Seton, Ernest Thompson, 6506

Social Settlements, 6670

Taft, Lorado, 6998

Volunteers of America, 7568

Wanamaker, John, 7590

Webster, Daniel, 7696-7697

TRUSTWORTHINESS

Arthur, King, 430

Cleveland, Grover, 1467-1472

Dog: A Tribute to a Dog, 1987

Franklin, Benjamin, 2593-2597

Grenfell, Sir Wilfred, 2962-2963

Hay, John, 3092

Livingstone, David, 4061

Rasmussen, Knud, 5998

Root, Elihu, 6197

Saint Bernard, Great, 6303

Taft, William Howard, 6998-7005

Quotations

If a task is once begun,
Never leave it till it's done;
Be the labor great or small,
Do it well, or not at all.

—*Phoebe Cary.*

So long as we love, we serve.

—*Stevenson.*

Small service is true service while it lasts.

—*Wordsworth.*

They also serve who only stand and wait.

—*Millon.*

5. Practicing the trait.

Children choose points on which they need to be more trustworthy in rendering service, and begin practicing as opportunities are found. The help of parents and teachers may be enlisted, if the pupils prefer to have their aid.

6. Problems encountered in living up to the ideal.

Children bring to the class the problems which they encounter. The teacher and the

class help to decide desirable courses of action. The cases to be considered are of great variety; some of them are here suggested:

Is there any dishonor in borrowing money from a fund entrusted to you by the club, though you expect to pay it back before it is needed?

Should a class officer have privileges not granted to all members of the club?

Should a pupil accept the position as editor of the class paper and then neglect the duties of the office?

Is it right for some pupils to clean up scraps left on the playground or thrown on the street by others?

Should a reward be accepted for returning a lost article to its owner? For selling Red Cross Christmas seals? For getting your mother to join the parent-teacher organization?

7. Generalizations.

The satisfaction which comes from rendering service brings its own reward.

Self-respect and the respect of others are better than power or riches.

LOWER LEVEL: UNIT NINE

Kindness and Sympathy

1. Arousing interest in the traits.

Through stories such as "Baucis and Philemon," page 653, and "Androcles and the Lion," page 685, interest may be aroused.

2. Applying the trait to life-situations.

Children make an extensive list of situations in which kindness and sympathy may be shown. A few examples such as children may suggest are listed below:

A boy rescuing a cat from an angry dog.

A girl caring for a sick baby while the mother gets some rest.

Children sending scrapbooks to the hospital for the enjoyment of crippled children.

Providing food for birds on snowy days.

An older child comforting a little child who is cross or frightened.

A boy helping a classmate to deliver papers in order that the latter may have time to practice for a class play or an athletic contest.

A boy doing an unpleasant task without a complaint.

3. Observing kindness and sympathy in the lives of others.

Children make a list of instances in which they have seen these traits displayed. The list may contain such items as these:

Neighbors cutting the wheat for a sick farmer.

A women's club sewing for the children in a poor home in which the mother is ill.

The community providing food and clothing for its needy citizens.

A man giving money to a hospital, so that people who are sick may be properly cared for.

4. Reading and reporting about acts showing kindness and sympathy.

References below are to pages in THE WORLD BOOK Encyclopedia:

Asylum, 478

Aurelius, Marcus, 504

Balder, 576-577

Baltimore, Sir George Calvert, 590

Baucis and Philemon, 653

Bible: I Corinthians, 726

Dostoevsky, 2014

Dunbar, Paul L., 2054

Fox, George, 2555

Froebel, Friedrich, W., 2624

Furness, Horace H., 2646

Gamaliel, 2672

Hood, Thomas, 3223

Hospice, 3256

Israels, Josef, 3569

Jackson, Helen Hunt, 3604

Lafayette, Marquis de, 3838-3839

Nightingale, Florence, 5026-5027

Oglethorpe, James, 5166-5167

Old-Age Pensions, 5189-5190

Patti, Adelina, 5418

Pestalozzi, Johann Heinrich, 5513-5514

Red Cross, 6025-6030

Russell Sage Foundation, 6256-6257

Schumann-Heink: Gift to Soldiers, 6430

Sidney, Sir Philip, 6504

Institution of Charities: See discussions under the stories of the different states: 4326, 4514, 4535, 4551, 4856, 4919, 4927, 4968, 5066, 5169, 5465, 7120, 7625

Underground Railroad, 7350
 Van Dyke, Henry, 7460, 7462
 Wandering Jew, 7590-7591 (negative example)
 Wesley, John, 7708-7710
 Wesley, Charles, 7710
 Whittier, John G., 7754-7756
 Wilberforce, William, 7758, 7760
 Wordsworth, William, 7845-7847

KINDNESS TO ANIMALS

Albatross, 182
 Ancient Mariner, 275
 Audubon Society, 498
 Bergh, Henry, 712
 Birds: Building Bird Houses, 759
 Government Protection of Birds, 766
 Coleridge, Samuel T., 1535
 Cruelty to Animals, Society for the Prevention
 of, 1760
 Humane Societies, 3282
 Androcles and the Lion, 6859
 Singing Tower, 6619-6621

Quotations

There's no dearth of kindness
 In this world of ours;
 Only in our blindness
 We gather thorns for flowers.

—Massey.

The world is happy,
 The world is wide;
 Kind hearts are beating
 On every side.

—James Russell Lowell.

5. Practicing the traits.

From the list of situations in which kindness

and sympathy may be practiced [see (2) above], children choose points on which they find themselves weak, and plan to practice the traits in such situations.

6. Problems encountered in living up to the ideals.

Children present the problems arising in their practice for the teacher and the group to help solve. They may have such problems as the following:

I saw a boy in trouble to-day. I could have helped him, but last week he struck my little brother. You don't think I should have helped him, do you?

I could have helped my sister wash the dishes this morning so that she could get to school on time, but my older brother says that housework is for girls. He never does any of it; why should I?

I stopped at a man's house to tell him that his cow was in his garden; he scolded me for ringing the bell and disturbing his wife, who was asleep.

The citizenship club put me on a committee to decide how to spend the \$15 which we have in our treasury. The committee wants to use the money to help boys and girls less fortunate than we are. How shall we go about it?

7. Generalizations.

Helping others bring happiness to one's self. People are kinder to you when you are kind to them.

It is easier to be kind when you think how you would feel if you were in the other person's place.

LOWER LEVEL: UNIT TEN

Industry and Perseverance

1. Awakening interest in the traits.

Interest may be secured through reading and discussing the poem, "Columbus," by Joaquin Miller, page 1574, and stories of the work of Thomas A. Edison, master mind in the electrical field, whose industry has given the world so much comfort and happiness, told on pages 2108-2110.

2. Applying the traits to life-situations.

Children make coöperatively a list of situations showing industry and perseverance. A few examples are given below:

Doing out-of-school practice to learn multiplication facts.

Working extra hours in the school shop to make an article of furniture for the home.

A ball team practicing more vigorously because of a defeat.

Selling papers before and after school in order to be able to stay in school and finish the course.

Finishing a story for the school paper instead of playing ball.

3. Observing industry and perseverance in the lives of people in the community.

Children make a list of instances in which they have seen the traits displayed. Such a list may contain the following facts:

A college student working as a waiter in a tea room to be able to finish the course.

A business man getting up at five o'clock to care for his lawn and garden.

A mother sewing for others in order to keep her children in school.

A bank clerk working nights in a studio to learn to paint.

4. Reading.

About people who have achieved great things through industry and perseverance.

References in THE WORLD BOOK Encyclopedia to achievements through perseverance are listed below:

INVENTION AND SCIENTIFIC DISCOVERY

Aircraft: Aircraft Heavier than Air, 118-121

Arkwright, Richard, 403
 Bell, Alexander Graham, 703
 Field, Cyrus W., 2408
 Holland, John F., 3195-3196
 Morse, Samuel F. B., 4664
 Newton, Sir Isaac, 4960-4963
 Palissy, Bernard, 5317
 Telegraph: Historical Sketch, 7064, 7066
 Wright, Orville and Wilbur, 7896-7897
 Zeppelin, Ferdinand, Count von, 7972-7973

DISCOVERY AND COLONIZATION

Columbus, Christopher, 1572-1577
 De Soto, Fernando, 1917-1918
 Gilbert, Sir Humphrey, 2806
 Henry the Navigator, 3149
 La Salle, René, Sieur de, 3882-3884
 Magellan, Ferdinand, 4211-4212
 Plymouth Colony, 5665-5669
 Smith, John, 6650

EXPLORATION

Aircraft: Lindbergh's Atlantic Conquest, 147-151
 Lindbergh, Charles A., 4025-4030
 Amundsen, Roald, 268-269
 Arctic Exploration, 5692-5695
 Antarctic Exploration, 5696-5699
 Shackleton, Sir Ernest, 6522
 Stefánsson, Vilhjalmur, 6823

CREATIVE WORK IN ART, LITERATURE, MUSIC

Handel, George F., 3034
 Michelangelo, Buonarroti, 4453-4456
 Millet, Jean François, 4488-4489
 Milton, John, 4491-4494
 Murillo, Bartolomé, 4746-4748
 Sabatini, Rafael, 6289-6290
 Schubert, Franz Peter, 6429-6430

COLLECTING AND PUBLISHING INFORMATION

Audubon, John J., 498
 Parkman, Francis, 5382
 Stefánsson, Vilhjalmur, 6823

OVERCOMING HANDICAPS

Bridgman, Laura, 955
 Keller, Helen, 3751
 Pulitzer, Joseph, 5876-5877
 Riis, Jacob, 6127
 Roosevelt, Theodore: Boyhood and Youth, 6186
 Washington, Booker T., 7634-7636

SERVICE TO NATION AND MANKIND

Alfred the Great, 205
 Bruce, Robert, 982
 Bryan, William J., 986-987
 Demosthenes, 1890
 Foch, Ferdinand, 2505

Garfield, James A., 2689-2693
 Garibaldi, Giuseppe, 2693-2694
 Grant, Ulysses S., 2899-2908
 Joan of Arc, 3677-3679
 Joffre, Joseph, 3680-3681
 Luther, Martin, 4158-4159

Quotations

Honor lies in honest toil.

—Cleveland.

He only is a well-made man who has a good determination.

—Emerson.

If a task is once begun,
 Never leave it till it's done;
 Be the labor great or small,
 Do it well or not at all.

—Phoebe Cary.

Let us then be up and doing,
 With a heart for any fate;
 Still achieving, still pursuing,
 Learn to labor and to wait.

—Longfellow.

I propose to fight it out on this line if it takes all summer.

—Grant.

Be strong!
 It matters not how deep entrenched the wrong;
 How hard the battle goes, the day how long;
 Faint not—fight on.
 Tomorrow comes the song.

—Babcock.

Everyone is the son of his own works.

—Cervantes.

5. Practicing the traits.

From the list made under (2) above, children choose the points on which they find themselves weak, and begin to practice them. In almost all cases, a pupil may secure the help of the parent in carrying out the practice faithfully.

6. Problems encountered in practicing the traits.

Children tell of their problems and seek help in finding solutions. Here are a few that are typical:

My mother wants to help me with hard problems before I have seriously tried to solve them alone.
 What should I do about it?

My mother tells me to go to bed at nine o'clock, even though I want to solve a problem, write a report, or practice on some drill work. Should I obey?

I want to learn to read better, but I haven't any good books.

I can't find any place to study at home.

I can get a job at \$8 a week. My mother needs the money. Should I leave school to take the job?

7. Generalizations.

Work as well as play brings pleasure.

A task completed well brings a feeling of satisfaction.

Work is like a game; you are always hoping you can win.

UPPER LEVEL: UNIT ONE

Honesty and Justice**1. Awakening interest in the traits.**

Interest may be awakened through the use of such stories as "Incidents in the Early Life of Abraham Lincoln," pages 4009-4010; incidents from Franklin's "Autobiography"; "The Bell of Atri," or stories from Robin Hood.

2. Applying the traits to life-situations.

The children make coöperatively a list of situations in which they themselves may practice honesty and justice, such as follow:

- Correcting our own work fairly.
- Returning the surplus, if too much change is given us.
- Admitting our faults.
- Bringing honest excuses for absence.
- Telling who is to blame if some one else is to be punished for our wrong-doing.

3. Observing the traits in the lives of people in the community.

The children suggest instances in which they have seen honesty displayed, such as the following:

- People who sell goods, giving full weight.
- Children paying their way at performances instead of trying to slip in unobserved.
- People returning borrowed articles in good condition.
- Children telling their parents the full truth about difficulties they encounter at school.

4. Reading.

Stories about people who have practiced honesty and justice, and other topics which disclose the same traits.

References below are to pages in *THE WORLD BOOK Encyclopedia*:

JUSTICE

- Aristides, 381
- Belgian Congo: Story of Development, 691
- Confucius, 1605-1606
- Equity, 2284
- Galsworthy, John, 2668-2669
- Hammurabi, 3029
- Harun-al-Rashid, 3065
- Landis, Kenesaw M., 3852
- Lincoln, Abraham, 4016-4018
- Reading, Rufus, 6013
- Public Schools: Consolidated Schools, 6423
- Workmen's Compensation Laws, 7847

HONESTY

- Canute, 1179
- Coligny, 1536
- Crockett, David, 1749
- Diogenes, 1953
- Fillmore, Millard, 2415-2419

- Guest, Edgar, 2977-2978
- Hamilton, Alexander, 3025-3026
- Harrison, Benjamin, 3053-3059
- Hayes, Rutherford B., 3093-3099
- Hill, James J., 3179
- Hippocrates, 3182
- Hoover, Herbert C., 3226-3235
- Houdini, Harry, 3259-3260
- Hughes, Charles E., 3276-3277
- Norway: Travel in Norway, 5084
- Roosevelt: President of the New York Police Commission, 6188; Governor of New York, 6188
- Scott, Sir Walter: Struggle against Financial Difficulties, 6450-6451
- Stimson, Henry L., 6835
- Taft, William Howard: On the Federal Bench, 6999-7000
- Tweed, William M., 7330 (negative example)

IN BUSINESS

- Adulteration of Foodstuffs and Clothing, 54-57
- Banks and Banking: The Case of Joseph Robins, 604
- "Blue Sky" Laws, 806
- Receiver, 6022

IN GOVERNMENT AND POLITICS

- Alaska: Development of Coal Lands, 176
- Australian Ballot: Greater Honesty in Elections, 522
- Permanent Court of International Justice, 5489-5490

REFERENCES FOR PARENTS AND TEACHERS

- Dishonesty in Children, 1962-1964
- Honor, 3221-3222
- Kleptomania, 3803

Quotations

- Dare to be true; nothing can need a lie;
A fault which needs it most gains nothing thereby.
— *Herbert.*
- He who feeds men, serveth few;
He serves all, who dares be true.
— *Emerson.*
- Truth crushed to earth shall rise again;
The eternal years of God are hers.
— *Bryant.*
- Truth is as impossible to be soiled by any outward touch as the sunbeam.
— *Millon.*
- This above all; to thine own self be true,
And it shall follow, as the night the day,
Thou canst not then be false to any man.
— *Shakespeare.*

5. Practicing the traits.

Children choose from the full list suggested under (2) those points on which they find themselves weak. If they wish to do so, they

enlist the help of parents and teachers. Over a period of time, they practice individually to improve in these specific instances.

6. Problems encountered in living up to the ideals.

Children discuss their problems, and the teacher tries to help them to decide what they should do in such cases as the following:

How much help should a child receive from his parents in doing his home work?

If you see another child cheating, what should you do about it? What should you do if you injure public property?

If a friend asks how you like her dress and you do not like it, what should you say?

7. Generalizations.

Our own self-respect is worth more than the articles we are tempted to take from other people.

Honesty gives us a feeling of satisfaction.

UPPER LEVEL: UNIT TWO

Courage

1. Awakening interest in the trait.

Interest may be awakened through the quotations given in this unit, or through the use of such stories as Arnold von Winkelried, pages 7795-7796; "Leonidas at the Pass of Thermopylae," pages 3937, 7146; "Horatius at the Bridge," page 3238; Joan of Arc, pages 3677-3679; "David and Goliath," pages 1834-1835, etc.

2. Applying the trait to life-situations.

The children make coöperatively a list of situations, such as follow:

Going upstairs to bed alone and in the dark.

Telling the truth even when we know we will be punished.

Saying our prayers when we stay all night with children who do not.

Preventing a group of children from teasing an animal, or some unfortunate child.

3. Observing the trait in the lives of the people in the community.

The children suggest cases which they have observed, such as these:

Doctors and nurses going into homes in which there are dangerous diseases.

Firemen entering burning buildings.

Policemen arresting desperate criminals.

Telephone operators remaining at their posts to notify people of fires or floods.

Life guards risking their own lives to rescue drowning persons.

4. Reading:

Stories about people who have been courageous, and other articles which relate instances of courage.

References below are to pages in THE WORLD BOOK Encyclopedia:

PHYSICAL COURAGE

Abruzzi, 10

Aeneid, 67

Aircraft: Early Efforts, the Balloon, 113, 114;

First Great Feats in Flying, 139-151

Alamo, 165-166

Alexander the Great, 199-201

Amundsen, Roald, 268-269

Armada, 405-406

Bainbridge, William, 573

Balaklava, 574-575

Boone, Daniel, 858-859

Bozzaris, Marco, 914

Byrd, Richard E., 1053-1054

Carnegie Hero Funds, 1204

Charge of the Light Brigade, 1310

Clark, George Rogers, 1455

Coast Guard, 1509-1512

Cook, James, 1649

Cortez, 1700-1701

Croix de Guerre, 1751-1752

Custer, George A., 1792-1793

Decatur, Stephen, 1856

Dewey, George, 1926-1927

Distinguished Service Medals, 1968-1970

Drake, Sir Francis, 2022

Emmet, Robert, 2227-2228

Erie: Battle of Lake Erie, 2286-2287.

Farragut, David G., 2373

Foreign Legion, 2532

Gordon, Charles George, 2874

Gustavus Adolphus, 2988-2989

Hale, Nathan, 3016

Hannibal, 3037-3038

Hector, 3124

Hercules, 3156-3157

Hobson, Richmond P., 3189

Horatius, 3238

Hudson, Henry, 3270-3271

Jones, John Paul, 3695-3697

Judith, 3706

Kane, Elisha Kent, 3732-3733

Lawrence, James, 3900

Lee, Henry, 3916-3917

Legion of Honor, 3924

Lewis and Clark Expedition, 3956-3959

Lindbergh, Charles A., 4025-4030

Livingstone, David, 4061-4062

MacMillan, Donald Baxter, 4194

Magellan, Ferdinand, 4211-4212

Marco Polo, 5714, 5716

Massachusetts: History, 4331-4332

Modern Lighthouses (Grace Darling), 4000
 Moses, 4670-4674
 Mosquito: The Tiny Mosquito and the Big
 Panama Canal, 4678
 Nelson, Horatio, 4872-4875
 Peary, Robert Edwin, 5435-5436
 Pitcher, Molly, 5630
 Plymouth Colony, 5665-5666
 Polar Exploration, 5691-5699
 Pontoon, 5727
 Royal Canadian Mounted Police, 6219-6221
 Saint Bernard, Great, 6303
 Scott, Robert Falcon, 6448
 Secord, Laura, 6476-6477
 Shackleton, Sir Ernest, 6522
 Sheridan, Philip Henry, 6555-6556
 Stanley, Sir Henry Morton, 6802
 Stefánsson, Vilhjálmur, 6823
 A Little Dutch Hero, 6857-6858
 Wallace, Sir William, 7584
 Wayne, Anthony, 7685
 Wilkins, Sir George Hubert, 7763
 Winkelried, Arnold von, 7795-7796
 Wolfe, James, 7818

MORAL COURAGE

Adams, John, 24
 Adams, John Quincy, 30-34
 Albert I, 183
 André, John, 278
 Anthony, Susan B., 307
 Beethoven, 686-688
 Brandeis, Louis D., 922
 Brewster, William, 944
 Frohman, Charles, 2626-2627
 Grenfell, Sir Wilfred, 2962-2963
 Hampden, John, 3029-3030
 Hancock, John, 3031-3032
 Henley, William E. 3141
 Knox, John, 3809-3810
 Lincoln, Abraham, 4011-4019
 Lloyd George, 4065-4067
 Luther, Martin, 4158-4159
 Saint Paul, 5419-5421
 Theodore Roosevelt: Governor of New York,
 6188; the Administration of Theodore Roose-
 velt, 6190
 Schurz, Carl, 6431

Quotations

The bravest are the tenderest,
 The loving are the daring.

—Taylor.

In the world's broad field of battle,
 In the bivouac of life,

Be not like dumb, driven cattle—
 Be a hero in the strife.

—Longfellow.

I dare do all that may become a man;
 Who dares do more is none.

—Shakespeare.

Dream not helm and harness
 The signs of valor true;
 Peace hath higher tests of manhood
 Than battle ever knew.

—Whittier.

Did you tackle that trouble that came your way
 With a resolute heart and cheerful?
 Or hide your face from the light of day
 With a craven soul and fearful?
 Oh, a trouble's a ton, or a trouble's an ounce,
 Or a trouble is what you make it;
 And it isn't the fact that you're hurt that counts,
 But only how did you take it?

—Edmund Vance Cooke.

An ounce of pluck
 Is worth a pound of luck.

I have no fear. What is in store for me
 Shall find me ready for it, undismayed.
 God grant my only cowardice may be
 Afraid—to be afraid.

—Appleton.

5. Practicing the trait.

Children choose from the full list suggested under (2) those points on which they find themselves weak. If they wish to do so, they enlist the help of parents and teachers, and over a period of time they practice individually to improve themselves.

6. Problems encountered in living up to the ideal.

Children discuss their problems and the teacher tries to help them decide what should be done. Typical problems are the following:

Should we insist on doing what we know to be right, if the others of our group do the contrary thing?

How can we be sure our ideas are right if almost everybody else believes differently?

Won't we be forced to play alone if our ideas of moral courage are different from those of our friends?

Should we try to force other people to have the same ideas of moral courage as we have?

7. Generalizations.

Moral courage, rather than physical, is the type demanded to-day.

If we do not show that we are afraid, our fears will lessen.

UPPER LEVEL: UNIT THREE

Thoroughness

1. Awakening interest in the trait.

Interest may be awakened through the use of such stories as those of Booker T. Washing-

ton (see the incident about sweeping floors. in "Up from Slavery"); Roosevelt's struggle for health; George Washington as manager of

a plantation; Edison's search for material for the electric lamp.

2. Applying the trait to life-situations.

The children make coöperatively a list of situations in which they themselves need to exercise the virtue of thoroughness. A few examples follow:

- Washing the dishes clean.
- Cutting all of the lawn, including the clipping of grass near the sidewalk.
- Keeping at lessons until they are thoroughly understood.
- Finishing the volunteer projects undertaken.
- In sewing or in manual training, properly finishing the edges and the insides of projects.

3. Observing the trait in the lives of people in the community.

The children suggest cases which they have observed, such as the following:

- Gardeners pulling weeds in a garden.
- Women moving the furniture in a room, in order to sweep or clean thoroughly.
- Girls washing out the dishcloth after washing the dishes.
- Boys cleaning and polishing the automobile, sweeping the floor, and dusting the seats.

4. Reading.

Stories about people who have been thorough in their work, and articles emphasizing the trait.

References below are to pages in *THE WORLD BOOK Encyclopedia*:

- Appian Way, 322
- Archimedes, 358
- Augustus, 502-504
- Aurelian, 504
- Bach, 563
- Balzac, 591-592
- Bancroft, George, 597
- Bede, 671
- Calvin, John, 1100-1101
- Carlyle, Thomas, 1200-1201
- Carnegie, Andrew, 1202-1203
- Champlain, Samuel de, 1301-1302
- Charlemagne, 1312-1313
- Coolidge, Calvin, 1651-1659
- David, King of Israel, 1834-1836
- Frederick II, 2600-2601
- Galton, Sir Francis, 2669
- Goethals, George W., 2852-2853
- Gorgas, William C., 2875
- Greene, Nathanael, 2957
- Harper, William R., 3049-3050

- Joffre, Joseph J., 3680-3681
- Kemal, Mustapha, 3752-3753
- Kitchener, Horatio H., 3798-3799
- MacMonnies, Frederick, 4195
- Marconi, Guglielmo, 4287-4288
- Mayo Brothers, 4355
- Naval Academy: Entrance Requirements and Studies, 4835, 4839
- Panama Canal: Sanitary Triumphs, 5332
- Peter the Great, 5515-5516
- Postoffice Department: Railway Postoffice, 5776
- Railroad: Modern Railroad Construction, 5978-5980
- Antarctic Explorations, 5696-5699
- Rainier (Guides), 5987
- Rasmussen, Knud, J. V., 5998
- Reaping Machine: Combined Harvester Thrasher, 6016
- Good-Roads Movement: Results Already Accomplished, 6144-6145
- Root, Elihu, 6197-6198
- Ships: Construction, 6564-6565
- Signaling and Signals, 6598-6601
- Victoria, 7517-7519

5. Practicing the trait.

Children choose from the full list suggested under (2) those points on which they decide that they are weakest. If they wish to do so, they may enlist the help of parents and teachers while they are attempting to form the specific habits on their list. Over a period of time they practice individually to improve themselves.

6. Problems encountered in living up to the ideal.

Children discuss the problems they have encountered in attempting to carry the ideal into practice, and the teacher attempts to help them decide what should be done. Some typical problems are given below:

- Is it worth while to be thorough in every act we undertake?
- How can we find time to play if we attempt to do all our work thoroughly?
- Can one person be thorough if none of his companions or brothers and sisters are?
- Is it better to do a few things very well, or many things fairly well?

7. Generalizations.

Being thorough in the work you are doing now makes the work that comes later easier to do.

Thoroughness usually leads to success.

UPPER LEVEL: UNIT FOUR

Appreciation of Service

1. Awakening interest in the trait.

Interest may be awakened through such stories as "Androcles and the Lion," on page

4038, "The Nuremberg Stove," or Emerson's "Essay on Friendship." The last two may be found in nearly all school libraries.

2. Applying the trait to life-situations.

The children make coöperatively a list of situations in which they themselves need to exercise the virtue of appreciation or gratitude. A few examples follow:

Letting father know that I am trying to work hard at school because he is spending money to keep me there.

Showing mother I appreciate her work for me by helping her without being asked to.

Thanking the teacher for extra help given.

Writing a letter of appreciation to a speaker who has talked to the class.

Voting a privilege to some member of the group who has merited special honors.

3. Observing the trait in the lives of people in the community.

Typical examples are the following:

People thanking a street-car conductor for waiting for them.

A woman thanking a stranger for having opened a door for her.

Children thanking the maid for helping them mend their toys.

Pupils thanking the janitor for adjusting playground equipment.

Neighbors sending small gifts of flowers, etc., to those who helped them during sickness.

4. Reading.

Stories about people who have appreciated service rendered to them, and articles which emphasize service to mankind.

References below are to pages in THE WORLD BOOK Encyclopedia:

Arlington, 403-405

Confederate Army Societies, 1602-1603

Grand Army of the Republic, 2893-2894

Hall of Fame, 3022

Madonna of the Trail, 7239

Stevenson, Robert L.: His Place in Literature, 6833

Thomas, Theodore, 7153

Van Dyck, Sir Anthony, 7460

Verdi, Giuseppe, 7492

Virginia: The New Era, 7545

Wilson, Woodrow: The Private Citizen, 7786

Wood, Leonard, 7828

Wright, Orville and Wilbur, 7896-7897

Quotations

And how can man die better

Than facing fearful odds

For the ashes of his fathers

And the temples of his gods?

—Macaulay.

Let the man who would be grateful think of repaying a kindness, even while receiving it.

—Seneca.

5. Practicing the trait.

Children choose from the full list suggested under (2) those observances which they themselves habitually neglect. Over a period of time they attempt to develop the attitudes and appreciations mentioned.

6. Problems encountered in living up to the ideal.

Children discuss the problems they have encountered in attempting to put the ideal into practice. The teacher helps them decide what should be done. Some typical problems follow:

How can we express appreciation for services rendered us by the whole community—for example, the use of the parks or the public library?

How can a bashful child express his appreciation? Are words or deeds better expressions of appreciation?

What should we do when people make fun of us for expressing appreciation?

7. Generalizations.

One method of showing appreciation is by a smile and a word of thanks.

Doing things for others is a good way of showing appreciation of what others have done for us.

UPPER LEVEL: UNIT FIVE

Initiative and Vision

1. Awakening interest in the traits.

Interest may be awakened through such stories as "James Watt and the Teakettle," page 6818; Joan of Arc, 3677-3679; the life of Tolstoi, 7203-7205; the life of Walt Whitman, 7753; Woodrow Wilson, 7778-7788; and the League of Nations, 3904-3906.

2. Applying the trait to life-situations.

The children make coöperatively a list of situations in which they themselves may exercise the virtues of initiative and vision. A few examples are given here:

Plan how to solve a bad situation which arises on the school playground.

Plan means by which it would be possible to have supervised play for a short time after school each day.

Plan how to beautify the schoolroom.

Plan how to beautify the school yard.

Arrange for a school exhibit for the benefit of the parents.

3. Observing the traits in the lives of people in the community.

Observe how the members of your church plan its support.

Notice how your parents plan to improve or beautify your home.

Notice how people in the community try to persuade the citizens to vote for such improvements as parks, new schools, etc. Notice that certain children plan new games or new ways of amusing the group.

4. Reading.

Stories about people who have had initiative and vision, and articles which provide examples of the traits.

References below are to pages in THE WORLD BOOK Encyclopedia:

VISION

Bacon, Francis, 564-565
Columbus, Christopher, 1572-1577
Curie, Pierre and Marie, 1787
Darwin, Charles, 1830-1831
Descartes, 1913
Faraday, Michael, 2370
Galileo, 2664-2665
Henry, Joseph, 3147
Hippocrates, 3182
Langley, Samuel P., 3857
Lavoisier, Antoine, 3896-3897
Lenin, Nikolai, 3930-3932
Marconi, Guglielmo, 4287-4288
Montessori Method, 4623-4628
Pasteur, Louis, 5411-5412
Pericles, 5487-5488
Radio: Scientific Basis of Radio, 5936
Radium, 5969-5971
Steinmetz, Charles P., 6823-6824
Stephenson, George, 6828
Telegraph: Historical Sketch, 7064
Telephone, 7067
Televox, 7087
Watt, James, 7681-7682

INITIATIVE

Barnum, Phineas T., 625
Blackwell, Elizabeth, 784-785
Comenius, 1580-1581
Dalton School Plan, 1813-1814
Dürer, Albrecht, 2056-2057
Edison, Thomas A. 2108-2110
Ericsson, John, 2285-2286
Ford, Henry, 2531
Gluck, Christoph W., 2844-2845
Gompers, Samuel W., 2868

Gordian Knot, 2874
Haynes, Elwood, 3100-3101
Ito, Hirobumi, 3589
Jetty: The Mississippi Jetties, 3671
Keeley, Leslie, 3751
McCormick, Cyrus H., 4174
Minnesota: Transportation (J. J. Hill), 4518-4519
Morse, Samuel F. B., 4664
Muir, John, 4732-4733
Pullman, George M., 5878
Reaping Machine, 6014
Stephenson, Robert, 6828
Strauss, Johann, 6875
Strauss, Richard, 6876

Quotations

Impossible—let me never hear that foolish word again.
—Mirabeau.

They can conquer who believe they can.

—Emerson.

Men may rise on stepping-stones of their dead selves to higher things.
—Tennyson.

5. Practicing the traits.

Children choose from the full list suggested under (2) those possibilities for developing the qualities of initiative and vision which they think they can apply to their own lives.

6. Problems encountered in living up to these ideals.

Children discuss the problems which they have encountered in attempting to put these ideals into practice. The teacher helps them to decide on the answers to the problems. Some typical questions are the following:

Can everyone be a leader?

Should you follow your own ideas, if those of another person are better?

How can you develop initiative and at the same time obey the rules laid down by parents and teachers?

How can you keep your friends if you develop initiative?

Will they always let you do the planning?

7. Generalizations.

Initiative can be developed by beginning along only a few lines.

One who wishes to be a leader part of the time must also be willing to be a follower part of the time.

UPPER LEVEL: UNIT SIX

Coöperation

1. Awakening interest in the trait.

Interest may be awakened through many stories that may be found in school libraries, such as "The Bundle of Sticks" ("Aesop's Fables"), "The Discontented Pendulum" (in Poulsson's "The Child's World"), "The Blind

Men and the Elephant," and Kipling's "The Ship that Found Herself." Read, also, "Androcles and the Lion," page 6859.

2. Applying the trait to life-situations.

The children make coöperatively a list of situations in which they themselves need to

coöperate as members of a group. A few examples are given herewith:

- Organize a volley-ball team.
- Organize a second team to give the first team adequate practice.
- Take part in the meetings of the citizenship club.
- Keep the floor clean near your seat.
- Take whatever part is assigned to you in a class dramatization.

3. Observing the trait in the lives of people in the community.

- Tell specific instances in which members of a base-ball team helped each other in the game.
- Observe how neighbors in your community help one another in times of sickness or fire.
- Observe how homes in which there is disease try to keep the malady from spreading through the neighborhood.
- Observe how workers in one department of a factory depend on the work of other departments.
- Notice how the janitor and the teachers of your school help each other.

4. Reading.

Stories about people who have coöperated with one another, and articles which emphasize the trait.

References below are to pages in THE WORLD BOOK Encyclopedia:

Agriculture: The Adams Family, 92
 Arbitration, 344
 Articles of Confederation, 432 (negative)
 Basket Ball, 639-641
 Brook Farm, 975
 Cincinnati, Society of the, 1430
 Cincinnati, 1430
 Collective Bargaining, 1536
 Community Interests, 1588-1590
 Coöperation, 1662-1664
 Gary, Elbert H., 2697
 George Junior Republic, 2753-2754
 Grange, 2897-2898
 Grotius, 2968
 Husband and Wife, 3297-3298
 Insurance, 3470-3472
 International Law, 3485-3487
 Kiwanis International Clubs, 3802-3803
 Labor Organizations, 3825-3826
 League of Nations, 3904-3906
 Lions Clubs, 4041
 Massasoit, 4336
 National Education Association, 4814-4815
 National League of Women Voters, 4815-4816
 National Research Council, 4816, 4819
 National Safety Council, 4819
 Olympian Games, 5196-5197
 Owen, Robert, 5277-5278
 Pan-American Congress or Conference, 5337-5338
 Parent-Teacher Associations, 5369-5370
 Passion Play, 5408-5411

Peace Conference, 5425-5426
 Permanent Court of International Justice, 5489-5490
 Police: Organization in the United States, 5702
 Postoffice Department, 5771-5777
 Red Cross, 6025-6030
 Junior Red Cross, 6030-6031
 Rotary Clubs, 6213
 Royal Canadian Mounted Police: Duties, 6220-6221
 Russell Sage Foundation, 6256-6257
 Saint Lawrence Waterway, 6314-6315
 Sociology: Community Organization, 6673
 Sons of Liberty, 6688
 Standardization in Business, 6797-6798
 Thrift (American Society for Thrift, International Congress of Thrift), 7161-7162
 Trails of Early Days: Santa Fe Trail, 7239
 United States of America: Relations with Canada, 7363
 Utopia, 7436
 Women's Clubs, 7826-7827
 World War: The Navy at Work, 7889; Soldiers in Europe, 7890; Americans in Battle, 7890; "Citizen Soldiers" at Home, 7890-7892

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Character Training: Team Work, 1308
 Education: Emphasis upon the Social Phase of School Life, 2114-2115
 Sociology, 6671-6673

5. Practicing the trait.

Children choose from the full list suggested under (2) those particular situations in which they feel that they have difficulty. If they wish to do so, they enlist the help of parents and teachers in developing these specific habits of coöperation.

6. Problems encountered in living up to the ideal.

Children discuss the problems which they have encountered in attempting to coöperate. The teacher helps them decide what they should do in each case:

- If my neighbor absolutely refuses to coöperate with me, what should I do?
- How can we keep the school yard clean and neat when other groups besides our own use it?
- Should I coöperate with children who are doing things that are wrong?
- Should I sell tickets in order to coöperate when I do not like to ask people to buy?

7. Generalizations.

The work of the whole group suffers unless each individual does his best.

Coöperation makes possible many undertakings which could not be accomplished otherwise.

UPPER LEVEL: UNIT SEVEN

Ambition

1. Awakening interest in the trait.

Interest may be awakened through the article on AMBITION, pages 244-246, or through such stories as "Dick Whittington and His Cat"; the life of Charles Dickens, pages 1936-1941; Robert Bruce, 982; Alexander the Great, 199-201.

2. Applying the trait to life-situations.

The children make coöperatively a list of situations in which they themselves may find spurs to ambition. A few examples are given herewith:

Talk with parents about qualities which lead children to success.

Talk with children who have done some especially meritorious piece of work, to find out how they did it.

Select some attainable object and work on it all year until we achieve it. Then tell the class what it was.

Select one school subject and work on it until we are able to bring up our grade.

From our reading, select a character that we should like to resemble.

3. Observing the trait in the lives of people in the community.

Notice a store or a building which has just been remodeled.

What is the owner's ambition?

Observe athletes practicing to attain certain skills in running, jumping, etc.

Find out the ambitions of older brothers or sisters.

From the way in which the school building and grounds are kept, what can we judge about the ambition of the children and the teachers?

4. Reading.

Stories about people who have been ambitious, and articles which point to the development of the trait.

References below are to pages in THE WORLD BOOK Encyclopedia:

Ambition, 244-246

Air Brake, 111

Alabama: Tuskegee Normal and Industrial Institute, 157

Continuation Schools, 1645-1646

Moonlight Schools, 4643-4644

Evening Schools, 6423

Fraternity: Origin, 2599

AMBITION IN LEADERS, STATESMEN, WARRIORS

Augustus, 502-504

Bonaparte, Napoleon, 828-833; 4807-4808

Caesar, Julius, 1066-1068

Calles, Plutarco, 1098

Clovis, 1496

Mussolini, Benito, 4781-4782

Peter the Great, 5515

Philip II, 5546

Richelieu, 6115-6117

AMBITION IN SOCIAL AND PERSONAL ACHIEVEMENT

Amundsen, Roald, 268-269

Barton, Clara, 632

Conrad, Joseph, 1621

Curtis, Charles, 1790-1791

Dickens, Charles, 1936-1941

Muir, John, 4732-4733

Nightingale, Florence, 5026-5027

Peary, Robert Edwin, 5435-5436

Scott, Robert Falcon, 6448

Thomas, Theodore, 7153

AMBITION OF LITERARY CHARACTERS

Arachne (negative example), 343

Becky Sharp (negative example), 668-669

Macbeth, 4171

Midas, 4469

Phaethon, 5530

The Coming of the Corn, 6858-6859

The Fir Tree, 6860-6863

Quotations

Too low they build who build beneath the stars.
—Young.

5. Practicing the trait.

From the full list suggested under (2), the children select a particular ambition to develop. They may confide their ambitions to their parents or to the teacher, and may report to the class when success has been achieved. The object is to make ambition a habit.

6. Problems encountered in living up to the ideal.

Children discuss the problems which they have encountered in attempting to realize this ambition. The teacher tries to help them to decide on the answers. Typical problems are the following:

Must one become great in order to realize an ambition?

Is ambition always a good thing?

Must one change his business to war or politics if he wishes to achieve an ambition?

Can one achieve his ambition, and yet be unselfish and friendly?

What should one do if he fails to achieve his life's ambition?

7. Generalizations.

Ambition may be either good or bad, depending on the results to ourselves and to other people.

Selecting an ambition early in life helps one to work harder.

UPPER LEVEL: UNIT EIGHT

Loyalty and Patriotism

1. Awakening interest in the traits.

Interest may be awakened through the quotations on page 5417 and such stories as David Farragut, page 2373; William Tell, 7089-7090; Simon Bolivar, 817; "The Story of Roland," 6163; "The Story of the Cid," 1424

2. Applying the traits to life-situations.

The children make coöperatively a list of situations in which they themselves may practice loyalty and patriotism. A few examples are given herewith:

Speaking respectfully of our parents.

Behaving on the street in such a way that the townspeople will think well of the children in our school.

Obedying the traffic rules and the city ordinances about trespassing.

Supporting the school officers that we have selected, when they try to improve the school.

Helping our church in its services.

3. Observing the traits in the lives of people in the community.

Notice how members of certain families help one another and speak courteously to one another.

Notice how certain church members attend the services of their church and work in its interest.

Observe how careful some men are to obey all of the traffic rules, even when no policeman is near.

Find out about the work of the nearest post of the American Legion.

4. Reading.

Stories about people who have showed loyalty and patriotism, and articles in which these traits are emphasized.

References below are to pages in THE WORLD BOOK Encyclopedia:

Abraham, 10

Achates, 20

Arnold, Benedict, 418-419 (negative)

Bismarck-Schönhausen, 774-775

Blondel, 796

Cavell, Edith, 1263

Galahad, Sir, 2659-2660

Garcia: A Message to Garcia, 2683

Hezekiah, 3170-3172

Ruth, 6282

Leonidas, 3937

LOYALTY

Acadia, 14

America, 247

Ben-Hur, 708-709

Bible: The Bible for Children, 729

Blenheim, Battle of, 790

Catacombs, 1236-1238

Dante Alighieri, 1821

Stephen A. Douglas, 2015-2016

Elizabeth, Queen, 2209-2210

Flag, 2449-2456

Gallatin, Albert, 2666

Gettysburg Address, 2793

Man without a Country (negative example), 3015-3016

Hindenburg, Paul von, 3181

Howe, Julia Ward, 3267

Naturalization, 4820-4821

Paderewski, 5294-5295

Patriotism, 5417

Peter the Great, 5515

Star-Spangled Banner, 6812, 6813

Tell, William, 7089-7090

United Empire Loyalists, 7361

SERVICE IN WAR

American Legion, 250-252

Army, 412-417

Battle Hymn of the Republic, 653

Bolivar, Simon, 817

Davis, Jefferson, 1837-1839

Foch, Ferdinand, 2505

Garibaldi, Giuseppe, 2693-2694

Hale, Nathan, 3016

John Sobieski, 3682

Jones, John Paul, 3695-3696

Kosciusko, Thaddeus, 3814

Lincoln, Abraham, 4011-4019

Navy of the United States, 4846-4848

Otis, James, 5271

Perry, Oliver Hazard, 5492-5493

Pershing, John Joseph, 5494, 5495

Poincaré, Raymond, 5681-5682

Red Cross in the World War, 6026, 6027, 6028, 6029

Revere, Paul, 6069

Taylor, Zachary, 7037-7039

Volunteers, 7567-7568

Warren, Joseph, 7621-7622

Wellington, Duke of, 7706-7707

Wood, Leonard, 7828

SERVICE IN PEACE

Adams, John, 24-29

Adams, John Quincy, 30-34

Addams, Jane, 35-36

Americanization, 249

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Boys' and Girls' Clubs, 903-908

Boy Scouts of America, 909-914

Bradford, William, 915

Bright, John, 955-956

Daughters of the American Revolution, 1833-1834

Dawes, Charles G., 1840-1841

Gladstone, William E., 2829

Jefferson, Thomas, 3646-3651

MacDonald, J. Ramsay, 4175-4176
 Marshall, John, 4304-4305
 National Hymns, 3316
 Penn, William, 5460-5462
 Root, Elihu, 6197-6198
 Stimson, Henry L., 6835
 Taft, William Howard, 6998-7004
 Venizelos, 7487
 Washington, Booker T., 7634, 7636
 Willard, Frances E., 7766-7767
 Young, Owen D., 7952

Quotations

I pledge allegiance to the flag of the United States of America, and to the Republic for which it stands; one nation, indivisible, with liberty and justice to all.

And thou, my Country, write it on thy heart,
 Thy sons are they who nobly take thy part;
 Who dedicates his manhood at thy shrine,
 Wherever born, is born a son of thine.

—Henry Van Dyke.

Breathes there the man with soul so dead,
 Who never to himself hath said,
 This is my own, my native land?
 Whose heart hath ne'er within him burned,
 As home his footsteps he hath turned,
 From wandering on a foreign strand?

—Sir Walter Scott.

Your flag is my flag!
 And oh, how much it holds—
 Your land and my land
 Secure within its fold.
 Brave men who work while others sleep,
 Who dare while others fly,
 They build a nation's pillars deep,
 And lift them to the sky.

—Ralph Waldo Emerson.

THE MESSAGE OF THE FLAG

My Stars and my Stripes are your dreams and your labors. They are bright with cheer, brilliant with courage, firm with faith, because you have made them so out of your hearts. For you are the makers of the Flag.

—Franklin K. Lane.

5. Practicing the traits.

From the full list suggested under (2), above, the children select the specific habits of loyalty and patriotism which they feel they most need to cultivate. Over a period of time, they endeavor to improve themselves in each of those respects.

6. Problems encountered in living up to the ideals.

Does being loyal to his church make one an enemy of the other churches?

Does being loyal to our friends mean that we must not see their faults?

Is the belief that other countries are ahead of the United States in some ways, a lack of patriotism? Should we obey laws which we cannot help but observe that many other people are breaking continually?

How can we show patriotism in times of peace?

7. Generalizations.

Loyalty in deeds is even more important than loyalty in words.

Patriotism demands that we obey our country's laws and try to improve its life in every way.

UPPER LEVEL: UNIT NINE

Unselfishness and Generosity

1. Awakening interest in the traits.

Interest may be awakened through such stories as that of Oliver Goldsmith, pages 2863-2864; the story of Lafayette, 3838-3839; the story of Pierre and Marie Curie, 1787; the story of Stephen Girard, 2813.

2. Applying the traits to life-situations.

The children make coöperatively a list of situations in which they themselves may practice the virtues of unselfishness and generosity. A few examples are given below:

Giving up the best chairs in the room to our parents.

Allowing our companions to share the use of our toys.

Giving to charity a sum of money which we ourselves have earned.

Allowing other children to have their turns as leaders in the games.

Sharing our candy with our friends.

3. Observing the traits in the lives of people in the community.

Notice that certain members of a family go without new clothes so that other members may have what they need.

Notice how adults share the pages of the newspaper.

Observe that certain members of the community refuse to believe evil stories about others. (Generosity in thought.)

Notice that younger people give up their seats in street cars to older people.

Notice that many poor people give money regularly to the church or to charity.

4. Reading.

Stories about people who have been unselfish and generous, and articles in which the traits are seen.

References below are to pages in THE WORLD BOOK Encyclopedia:

UNSELFISHNESS

Abelard, Pierre, 8

Alcestis, 192

Amundsen, Roald, 268-269

Apple: Johnny Appleseed, 324
 Augustine, Saint, 502
 Esther, 2299-2300
 Francis of Assisi, 2591
 Godfrey de Bouillon, 2851
 Lamb, Charles, 3846-3847
 Livingstone, David, 4061
 Marquette, Jacques, 4298
 Nightingale, Florence, 5026-5027
 Ohio: Agriculture (Johnny Appleseed), 5170
 Red Cross, 6025-6031
 Saint Bernard, Great, 6303
 Sidney, Sir Philip, 6594, 6595
 Story-Telling: Baucis and Philemon, 6864
 Waldenses, 7578-7579

GENEROSITY TO INSTITUTIONS

Carnegie, Andrew, 1202-1203
 Carnegie Libraries, 1204
 Cooper, Peter, 1661
 Cornell, Ezra, 1693
 Eastman, George, 2090
 Educational Foundations: Rockefeller Benefactions, 2129
 Carnegie Benefactions, 2129-2130
 Harvard, John, 3065-3066
 Hearst, Phoebe A., 3107
 Hewitt, Abram S., 3170
 Peabody, George, 5425
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 Rochester: Education, 6152-6153
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 Rockefeller, John D., 6153
 Rockefeller, John D., Jr., 6153-6154
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 Russell Sage Foundation, 6256
 Smithsonian Institute, 6652
 Vanderbilts, 7458-7459
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GENEROSITY TO OTHER PEOPLE

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 Girard, Stephen, 2813
 Gould (Helen Miller Gould Shepard), 2880-2881
 Hirsch, Maurice, 3185
 Joseph, 3698-3700
 Porto Rico: History, 5755-5756
 Pulitzer, Joseph, 5876-5877

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 Pullman, George M., 5878
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 Scholarships and Fellowships, 6415-6417
 Schumann-Heink: Gift to Soldiers, 6430
 Singing Tower, 6619

REFERENCES FOR PARENTS AND TEACHERS

Altruism, 238
 Character Training: Unselfishness, 1304
 Charity, 1311

Quotations

No one is useless in the world who lightens the burden of it for anyone else.

—*Dickens.*

Charity and personal force are the only investments worth anything.

—*Whitman.*

Not what we give, but what we share,
 For the gift without the giver is bare.
 Who gives himself with his alms feeds three—
 Himself, his hungering neighbor, and Me.

—*Lowell.*

5. Practicing the traits.

From the full list suggested under (2), the children select the specific habits in which they feel themselves weakest. If they wish to do so, they ask the assistance of parents and teachers while attempting to develop the new habits and attitudes.

6. Problems encountered in living up to the ideals.

Children discuss the problems which they have encountered in attempting to live up to their ideals. The teacher tries to help them decide what should be done. Typical problems are given below:

How can we help ourselves remember to be unselfish?

Can one person be unselfish when his companions are selfish?

Should we give our money to charity when we have very little for ourselves?

Should we continue to give money, or to do services for people who do not appreciate them?

Should we give food to strangers who come to our doors?

7. Generalizations.

Unselfishness brings us satisfaction.

Generosity in thought and deed makes us happy.

UPPER LEVEL: UNIT TEN

Self-Reliance and Independence

1. Awakening interest in the traits.

Interest may be awakened through such stories as those of Robinson Crusoe, page 6150;

Don Quixote, 2011; "The Ugly Duckling," 6854-6857; Benjamin Franklin, 2593-2597; Alfred the Great, 205; Robert Bruce, 982.

2. Applying the traits to life-situations.

The children make coöperatively a list of situations in which they themselves may practice the virtues of self-reliance and independence. A few examples follow:

Doing our school work without asking for more help than is needed.

Not asking questions about matters we could find out for ourselves.

Doing what we think is right (for example, refusing to "copy" lessons), no matter what others do.

Taking care of our own clothing (hanging clothes on hangers, pressing them, putting soiled clothing in the hamper, etc.).

Performing our tasks without waiting to be told.

3. Observing the traits in the lives of people in the community.

Notice that your parents discuss their problems and then decide for themselves what must be done.

Notice how certain pupils do all their work themselves and refuse to look on any one else's paper.

Notice that business men have to decide for themselves what kind of goods to buy, whether to give certain families credit, etc.

Observe that certain families have family prayers, even though none of their friends do.

4. Reading.

Stories about people who have been self-reliant and independent, and articles in which stories of these traits are developed.

References below are to pages in *THE WORLD BOOK Encyclopedia*:

SELF-RELIANCE

Aguinaldo, 107
Aircraft: Early Efforts:
The Balloon, 113, 115
First Great Feats in Flying, 139-151
Archimedes, 358
Aristotle, 382
Astor, Lady Nancy, 465
Baldwin, Matthias William, 577-578
Brandeis, Louis D., 922
Cromwell, Oliver, 1752-1754
Emerson, Ralph W., 2221-2222
Gorki, Maxim, 2876
Hannibal, 3037-3038
Jackson, Andrew, 3597
Johnson, Hiram W., 3689
Lindbergh, Charles A., 4025-4030
Livingstone, David, 4061
Nightingale, Florence, 5026-5027
Nursery School, 5118
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Story-Telling: The Larks in the Cornfield, 6860
Watauga Association, 7661
Westinghouse, George, 7714-7715
Whitman, Walt, 7753
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Borah, William E, 864
Borglum, Gutzon, 866
Copernicus, 1666
Declaration of Independence, 1865-1868
George, Henry, 2752
Harvey, William, 3068-3069
Hipparchus, 3182
Hutchinson, Anne, 3299-3300
Ibsen, Henrik, 3325
Jenner, Edward, 3655
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Luther, Martin, 4158-4159
Newton, Sir Isaac, 4960-4963
Sandburg, Carl, 6362
Shaw, George B., 6545
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Wallace, Alfred Russel, 7583
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Mascagni, Pietro, 4320
Millet, Jean F., 4488-4489
Roosevelt, Theodore, 6185-6197
Schurz, Carl, 6431
Tyler, John, 7332-7337
Victor Emmanuel II, 7517
Wagner, Richard, 7575-7577
Whistler, James M., 7743-7744

REFERENCES FOR PARENTS AND TEACHERS

Adolescence: Moral Conditions, 50;
Social Instincts, 51
Project Method in Teaching, 5834-5839

Quotations

I would rather be right than be President.

—Clay.

They are slaves who dare not be
In the right with two or three.

—Lowell.

5. Practicing the traits.

From the full list suggested under (2), the children suggest the specific habits in which they feel themselves to be weak. If they desire to do so, they freely ask the assistance of parents and teachers in developing these habits.

6. Problems encountered in living up to the ideals.

Children discuss the problems which they have encountered in attempting to live up to the ideals. The teacher tries to help them decide what should be done in each case. Typical problems are given below:

- If we follow the advice of older or wiser people, are we failing to be independent?
- How can we be self-reliant when we live at home with our parents?
- How can we be independent, and yet at the same time coöperate with others?
- In order to be self-reliant and independent, must we always be different from other people?

7. Generalizations.

Self-reliance does not mean that we must always have things our own way.

Independence does not mean that we must decide all questions without help.

METHODS OF CHARACTER TRAINING

References below are to pages in *THE WORLD BOOK Encyclopedia*:

Allegory, 224
 All-Year School, 228
 Biography: Biography for Children, 745
 Character Training, 1304-1308
 Emotions, 2228
 Ethics, 2304-2305

Fatigue and Nervousness among Children, 2380-2382

Habit, 2997-2999

Heredity, 3158-3161

Interest (in Psychology), 3476

Juvenile Court, 3725-3726

Juvenile Delinquency, 3726-3728

Kindergarten: Value of Home Play, 3784-3786

Direction of Development, 3790

Library, 3967-3972

Literature: The Study of Literature, 4048-4049

How Literature May Be Studied, 4049-4050

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